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ABSTRACT

This report describes the planning and implementing of the Experimental Volunteer Army Training Program (EVATP) at Fort Ord early in 1971. This was the Army's first effort to effect major training innovations in the conversion toward an all-volunteer Army. By the fall of 1971, this program was being used as a model for implementing the EVATP at other Army Training Centers. In developing the EVATP system, six established learning principles were applied to Basic Combat Training and Advanced Individual Training to modify the conventional training system. Course objectives and performance tests used were developed jointly by Fort Ord and HumRRO. In a comparison with a conventionally trained group, independently conducted by the Infantry School at Fort Benning, EVATP graduates performed significantly better on five out of seven BCT subjects, and seven out of nine AIT subjects. In general, these gains were shown by men at all levels of aptitude. (Author)

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The Concepts of Performance-Oriented Instruction Used in Developing the Experimental Volunteer Army Training Program

John E. Taylor, Eugene R. Michaels, and
Mark F. Brennan

HUMAN RESOURCES RESEARCH ORGANIZATION
300 North Washington Street • Alexandria, Virginia 22314

March 1972

Prepared for
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Department of the Army
Washington, D.C. 20310

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16. Abstracts

This report describes the planning and implementing of the Experimental Volunteer Army Training Program (EVATP) at Fort Ord early in 1971. This was the Army's first effort to effect major training innovations in the conversion toward an all-volunteer Army. By the fall of 1971, this program was being used as a model for implementing the EVATP at other Army Training Centers. In developing the EVATP system, six established learning principles were applied to Basic Combat Training and Advanced Individual Training to modify the conventional training system. Course objectives and performance tests used were developed jointly by Fort Ord and HumRRO. In a comparison with a conventionally trained group, independently conducted by the Infantry School at Fort Benning, EVATP graduates performed significantly better on five out of seven BCT subjects, and seven out of nine AIT subjects. In general, these gains were shown by men at all levels of aptitude.

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FOREWORD

The work reported here was undertaken in response to a request from the Office of the Special Assistant for the Modern Volunteer Army (OSAMVA). Its specific objective was to provide technical advice and assistance in support of the conception, development, and field test of the Experimental Volunteer Army Training Program (EVATP), the Army's first effort to effect major training innovations in the conversion toward an all-volunteer Army. The findings have been reported previously to many Army agencies for action purposes. This report was prepared to make the data and results available to a wider audience.

In the spring of 1972, the training concepts set forth here had been implemented in all CONUS Army Training Centers (ATCs) where Basic Combat Training and Advanced Individual Training in the combat military occupational specialties were being conducted. HumRRO assisted in effecting this CONUS-wide implementation by sending teams to all ATCs, and to the appropriate proponent Army schools, to provide technical guidance and assistance.

HumRRO's portion of the work was conducted by HumRRO Division No. 3, Presidio of Monterey, California, under the direction of Dr. Howard H. McFann. Dr. John E. Taylor served as the project leader with the assistance of COL Mark F. Brennan, USA (Ret.), Mr. Eugene R. Michaels, and Mrs. Olivia Butterstein, and by SGT Justice Parazo, SP4 Gary Kress, SP4 Jerry Martin, and SP4 Barry Cannady of the U.S. Army Training Center Human Research Unit.

Military support for the work was provided by the U.S. Army Training Center Human Research Unit commanded by COL Ullrich Hermann.

HumRRO's share of the work reported here was performed to assist and support the efforts of the officers and men of the Fort Ord training system as they implemented the EVATP. It was they who were required to effect large-scale changes in order to engineer a radically new trainee-trainer interface.

The efforts and dedication of one particular officer deserve special mention. LTC F.A. "Si" Nerone, serving as Fort Ord's Deputy Director for Plans and Training, worked far beyond the requirements of ordinary duty. His contribution to the success of the EVATP was of major proportion.

HumRRO research for the Department of the Army is conducted under Army Contract DAHC 19-70-C-0012. Training, Motivation, Leadership research is conducted under Army Project 2Q062107A712.

Meredith P. Crawford
President
Human Resources Research Organization

SUMMARY AND CONCLUSIONS

PROBLEM

In the fall of 1970, the Special Assistant for the Modern Volunteer Army (SAMVA) undertook a broad and long-range plan for conversion to an all-volunteer Army. This plan called for extensive innovation in the three areas of recruiting, life style, and training.

The Human Resources Research Organization was requested to (a) evaluate the effects of the life-style innovations; (b) help formulate the master plan guiding the training innovations; and (c) provide detailed technical assistance and advice to the commanding generals of the several training posts to be involved in developing and implementing the Experimental Volunteer Army Training Program (EVATP), the program's initial field training experiment.

Subsequent modifications of the training master plan reduced the number of training posts to be actively involved in the EVATP to one: Fort Ord, California. The EVATP formally commenced at Fort Ord in January 1971. By the fall of 1971, the EVATP in operation at Fort Ord was being used as the model to be followed by other Army Training Centers (ATCs) in accomplishing a CONARC-directed, CONUS-wide implementation of the EVATP principles.

This report chronicles the planning and implementation of the EVATP at Fort Ord over the period mid-November 1970 through 30 June 1971.

THE EXPERIMENTAL VOLUNTEER ARMY TRAINING PROGRAM (EVATP)

A number of established learning principles formed the foundation of the EVATP. These principles, derived from educational psychology and instructional technology, as well as from HumRRO research projects, were incorporated into an instructional system designed to train men with the widely differing learning aptitudes normally found in Army Training Centers. The six principles are as follows:

(1) Performance-Based Instruction. The student learns the skills necessary for job performance. Emphasis is on active skill practice, doing, rather than passive absorption of information.

(2) Absolute Criterion. Every student is required to reach a standard of performance in each skill. Assessment is on a "go/no-go" basis. The student who does not reach the standard of performance on initial assessment receives additional practice until he does reach it.

(3) Functional Context. The student learns in a job-relevant situation. Theoretical/technical material is presented only when it is needed in learning to perform a skill.

(4) Individualization. For various reasons, people learn at different rates. To the extent that it is possible, a student is permitted to learn a skill at his own rate.

(5) Feedback. To the extent the instructor knows how well his students can perform, he can modify his methods to be more effective. To the extent the student knows about his own skill acquisition, he can correct errors and improve his performance.

(6) Quality Control. To ascertain that the training system is functioning properly, students' acquisition and retention of skills must be assessed at various times during and at termination of training.

Translating these principles into an operational training system requires that crucial subject skills and knowledges have to be identified, course and subject objectives have to be stated in performance terms, performance tests have to be prepared, instructional techniques have to be established, and a quality-control system must be established to verify the effectiveness of instruction.

The application of these principles to Basic Combat Training (BCT) and Advanced Individual Training (AIT) meant that various changes had to be made in the conventional training system. They required shifts be made from:

(1) Familiarization and orientation instruction to training that ensures that *men are able to perform high-priority combat skills.*

(2) Alternate forms of standard written/performance tests using a 70% passing normative criterion to *randomized performance testings using an absolute go/no-go criterion.*

(3) A lecture-demonstration-practice instructional paradigm to *performance training maximizing hands-on experience and practice, and placing verbal presentations in relevant context.*

(4) Lock-step instruction to *techniques by which the trainee can learn at his own pace, as much as feasible.*

(5) An instructor role of mainly presenting information to *roles of demonstrating skills, organizing skill practice, and checking out all individuals at the training site to provide immediate feedback on skill acquisition.*

(6) Testing only at the end of BCT, to *a checkout immediately after instruction, a diagnostic test midway through BCT, and an end-of-course comprehensive proficiency test.*

FIELD TEST OF THE EVATP

The course objectives and performance tests used in the 16-week EVATP were determined jointly by Fort Ord and HumRRO. The U.S. Army Infantry School, the proponent agency for BCT and AIT Infantry instruction in training centers, validated these objectives and performance tests. HumRRO assisted Fort Ord in converting its training from the conventional to the experimental system.

Changing the conventional 8-week BCT program to a performance-based system required extensive conversion of the instructional techniques in seven skill subjects. Those subjects that were inherently performance-based in design, such as weapons firing and physical training, were not changed except to eliminate lecture and minimize demonstration time. Orientation subjects such as Military Justice and Code of Conduct were unchanged.

Advanced Individual Training in the EVATP program consisted of four weeks of Light Weapons Infantry training (11B MOS), three weeks of either Mortar Crewman (11C MOS) or Mechanized Vehicle Driver training, and one week devoted to a Field Training exercise. In Light Weapons Infantry training, all skill subjects except actual weapons firing were converted to performance-based training techniques. Mortar Crewman and Mechanized Vehicle Driver training subjects which were high in skill content, were also converted where necessary.

The subjects converted to performance-based instruction techniques under EVATP were as follows:

Basic	Advanced
First Aid	Survival, Escape and Evasion
CBR (Chemical, Biological, and Radiological)	Techniques of Fire and Tactics
Land Navigation	Communications
Guard Duty	Landmine Warfare
Rifle Functioning	M79/203 Grenade Launcher
Drill and Ceremonies	M72 LAW (Light Antitank Weapons)
Individual Tactical Training	Pistol, CAl .45
	Machinegun, M60
	Night Vision Devices
	Patrolling Counterinsurgency
	81-mm Mortar
	Mechanized Vehicle Training
	Machinegun, Cal .50
A General Subjects Test (4th week) and a Comprehensive Performance Test (8th week) were included.	A Comprehensive Performance Test for the 11B MOS was included.

The planned starting date for implementing the EVATP system was July 1971. A decision to move the starting date ahead to January 1971 imposed severe burdens on the training system by providing only one and one-half months of planning and development time. Consequently, conversion to the new system (development of objectives and performance tests, revision of instructional techniques and materials, and orienting of managers, instructors, and cadre) was only slightly ahead of the first cycle of experimental trainees. Under these conditions, it was necessary to introduce training innovations in increments as the successive training cycles passed through the system. Necessary revisions of the training innovations, resulting from field test, were also accomplished in a series of increments.

The biggest single difficulty encountered was in achieving the overall institutional change required to convert from conventional training to the experimental system.

Gradual conversion to the complete EVATP system was accomplished over approximately a 4-month period. As successive cycles of trainees passed through the system, they underwent larger proportions of performance-based instruction, they received instruction from instructors and unit cadre who were more proficient and motivated in conducting such instruction, and they were tested under the new go/no-go criterion, which was understood better and applied more realistically. Tracking of performance data over this period demonstrated clearly that improved trainee performance dramatically reflected this gradual accomplishment of institutional change.

PERFORMANCE COMPARISON OF THE EVATP WITH CONVENTIONAL TRAINING

An independent evaluation team from the Infantry School, the proponent agency for BCT and AIT (Infantry) instruction, compared the performance of samples of graduates from the conventional program conducted at Fort Jackson and from the

EVATP. The evaluation team prepared the tests, conducted the testing, and gathered data. HumRRO analyzed and interpreted the data. The Basic tests compared trainees' performance on selected skills from seven BCT subjects. In five of the seven subjects, EVATP graduates showed significantly higher performance:

1. First Aid	46% overall performance gain
2. CBR	a. 46% performance gain on using protective mask
	b. 54% performance gain on treating nerve agent casualty
3. Land Navigation	34% overall performance gain
4. M-16 Weapon Maintenance	20% overall performance gain
5. Guard Duty	12% overall performance gain
6. Individual Tactical Training	No change
7. Drill and Ceremonies	No change

The Advanced tests compared trainees' performances on selected skills from nine AIT subjects. In seven of the nine subjects, EVATP graduates showed significantly higher performance:

1. M72 LAW	82% performance gain
2. Land Navigation	50% performance gain
3. M79 Grenade Launcher	36% performance gain
4. Communications	31% performance gain
5. Landmine Warfare	30% performance gain
6. M-60 Machinegun	22% performance gain
7. NVD (Starlight Scope)	11% performance gain
8. .45 Cal. Pistol	No change
9. M203 Grenade Launcher	No change

Generally, these performance gains, in both Basic and Infantry MOS training, were registered by men at all levels of aptitude.

CONCLUSIONS

(1) The problems encountered in effecting massive institutional change in the ATC context are formidable. Quick conversion from one training system to another is not possible. Of the several components of the ATC training system that must change, by far the most resistant is instructor/cadre attitude. There exists a basic reluctance to depart from familiar instructional techniques.

(2) A performance-based training system that integrates Basic and Infantry MOS training can be implemented within an ATC's normal operating resources. It produces graduates with higher levels of demonstrated skill proficiency than does the conventional system.

(3) The system permits the attainment of higher levels of skill performance within the same or shorter time frames.

x

(4) Performance-based training permits high achievement by low- as well as by high-mental category personnel. The system tends to attenuate achievement differences attributable to aptitude level.

(5) In such a system, the use of an absolute go/no-go criterion of skill attainment is feasible and administratively practicable.

(6) The system provides a means for frequent assessment of the development of skill proficiency.

(a) Feedback of this information during instruction to both trainees and trainers provides an important feedback loop missing in the conventional system.

(b) Close monitoring of the available performance data by training managers at all levels provides a quick-response quality control system whereby strengths and weaknesses in any component of the training system can be pinpointed.

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The Concepts of Performance-Oriented Instruction Used in Developing the Experimental Volunteer Army Training Program

BACKGROUND

BRIEF HISTORY

To implement the Federal Government's announced plans to reduce reliance upon the draft and to undertake steps toward conversion to an all-volunteer Army by July 1973, the Department of the Army established the Office of the Special Assistant for the Modern Volunteer Army (OSAMVA) in the fall of 1970, under LTG George I. Forsythe. SAMVA's long-range plan proposed that the effects of extensive innovations be tested in depth and over a broad front, beginning as soon as practicable. The three general areas in which significant innovations were to be effected were recruiting, Army life style, and the development of professionalism (training).

In mid-November 1970, HumRRO representatives spent several days at the Pentagon, at SAMVA's request, assisting with the development of two of the components of the master plan: (a) evaluating the effects of innovations in Army life style, and (b) formulating an approach to accomplish large-scale innovation in the Army Training Center system, the Experimental Volunteer Army Training Program (EVATP). HumRRO's role in evaluating the effects of life-style innovations is the subject of a separate report.

ORIGINAL CONCEPT OF THE EVATP

Three posts—Fort Ord, California, Fort Carson, Colorado, and Fort Benning, Georgia—were to be involved in fielding the EVATP. Early guidance from the Department of the Army for development of the program was predicated upon both a controlled input of recruits into the training system, and directed assignments of graduates from the various components of the program conducted at the three posts.

Fort Ord was to serve as the entry point for recruits and was to receive a weekly input of approximately 800 trainees, all designated to be trained in Infantry skill areas. They were then to be programmed *either* for post-MOS training assignment to Fort Benning for further advanced training (Noncommissioned Officer Candidate School or Officer Candidate School), and then on to Fort Carson for duty in a TO&E unit, *or* for direct assignment from Fort Ord to Fort Carson for unit training. All EVATP trainees were to be exempt from overseas assignment until they had completed the full experimental cycle. Cadre assignments were to be stabilized for purposes of the experiment.

Based upon the foregoing input/output model, the program was initially structured so that the graduate of Fort Ord, after completing an integrated 16-week training cycle, could be qualified in as many as three skill areas: MOS 11B (Light Weapons Infantryman), MOS 11C (81-mm Mortar Crewman), and Mechanized Infantry Vehicle Driver. The conventional program, in comparison, qualified the Basic Combat Training - Advanced Individual Training (BCT-AIT) graduate in one skill area only, that is, either MOS 11B or MOS 11C. Some of the time required to accomplish these EVATP objectives was to be gained by instituting more efficient instructional techniques, reducing redundancy, integrating BCT with AIT, and consolidating instruction into related blocks. A full week was to be gained by eliminating the mandatory Republic of Vietnam (RVN) orientation training.

The EVATP was programmed to begin formally in July 1971, making available approximately seven months of lead time for planning, development of materials and techniques, and reorientation of instructors and cadre. Thus, an ambitious program for effecting large-scale institutional change was to be implemented following a period of adequate planning and careful retooling of the various components of the training system.

THE EVATP CONCEPT AS FIELDED

Events did not occur as planned.

The first major modification directed upon the experiment required that Fort Ord be prepared to begin the EVATP with its recruit cycle starting training on 11 January 1971. This reduced the actual effective planning-development-retooling time to approximately one and one-half months, a seriously inadequate time span. During this period, the Commanding General, Fort Ord (MG Phillip Davidson), dramatically restructured his organization for training in order to begin implementation of the main EVATP principles, and representatives from Fort Ord's training staff and HumRRO undertook a crash program to begin conversion of instruction and testing materials and techniques from the conventional to the EVATP system. Reorientation of instructor and cadre personnel was started, with considerable trepidation, with a high-saturation briefing and information-passing program.

The first training cycle to undergo the experimental program began, as directed, on 11 January, completed its eighth week of training (equivalent of conventional BCT) on 5 March, and completed its 16th week of training (equivalent of conventional AIT) on 30 April 1971, a full two months *before* the original programmed starting date. Consequently, this cycle received only those fragments of the full EVATP that could be hastily prepared in time for presentation. The cycles that followed received successively larger and more interrelated components of the EVATP, until near the end of April, when cycles entering the system actually underwent a fully developed version of the EVATP.

A second major modification of the program stemmed from the Department of the Army's inability to meet the original objective of an all-infantry designated input. The Department of the Army endeavored to control Fort Ord's receipt of Regular Army (RA) and AUS unassigned recruits so that approximately 200 of the trainees of each 800 weekly fill would be made available for the full 16 weeks of the EVATP. The remaining 600 exited the EVATP after eight weeks in order to undergo other advanced (noninfantry) training. This required that the sequence of certain training content be geared to the needs of the 600 departing noninfantry trainees, rather than to the needs of the 200 remaining who would receive the full EVATP. This "having of the cake and eating it" required a distinct break after eight weeks, and made the optimal sequencing of an integrated 16-week infantry training program almost impossible.

The modification having the greatest negative effect upon the fielding of the EVATP stemmed from the absence of the planned, predetermined, controlled flow of EVATP graduates. The Commanding General, Fort Ord, was informed by U.S. Continental Army Command (CONARC) in February 1971 that his EVATP graduates were to be eligible for world-wide assignment, and that Fort Ord's part of the EVATP should be modified to include RVN-orientation training. As a result of this directive, the systematic flow of Fort Ord EVATP graduates into the Fort Benning and Fort Carson components of the EVATP was aborted. This virtually eliminated the overall concept of a systematic three-post experiment. In effect, the EVATP was so reduced in scope that it became a "Fort Ord only" exercise.

Another major impact from this directive was made upon Fort Ord's conduct of the now-reduced EVATP. Because a week of training time was required to accomplish the

RVN orientation, the EVATP graduates were qualified in only two skill areas (MOS 11B and *either* MOS 11C *or* mechanized vehicle driver), rather than all three skills as originally planned.

With the three foregoing modifications, the EVATP actually fielded at Fort Ord departed significantly from that which had been originally conceived.

HumRRO'S OVERALL INVOLVEMENT IN THE EVATP

From mid-November 1970 until 30 June 1971, three professionals, four research assistants, and a secretary from the HumRRO staff were physically located, and worked full time with Fort Ord representatives in fielding the EVATP. Subsequent sections of this report provide detailed information on how this many-faceted institutional change was brought about, and on the results that it produced. The HumRRO representatives terminated their full-time involvement with the Fort Ord training system the end of June 1971 to resume research efforts held in abeyance for the EVATP work. They remained on call to assist Fort Ord personnel as the need arose.

The program proved so successful that as early as April 1971, with only partial results of the experiment available, the Commanding General, CONARC, directed a CONUS-wide reorientation of the Army Training Center (ATC) system along the general lines of performance-based training. As evidence of the superiority of a performance-based system over the conventional system continued to accumulate, CONARC guidance as regards the CONUS-wide ATC reorientation was expressed more explicitly in terms of EVATP specifics.

By late fall 1971, the EVATP in operation at Fort Ord was being used as the model for the other ATCs in converting their training programs. All ATCs sent contingents of instructor/cadre personnel to Fort Ord for orientation and to learn the system. HumRRO representatives assisted with these orientations, and, at the request of CONARC, initiated a series of workshop visits to each ATC to provide technical advice and assistance in converting to the EVATP system.

The following sections provide detailed information on the planning and implementation of the EVATP at Fort Ord over the period mid-November 1970 to 30 June 1971.

THE EXPERIMENTAL VOLUNTEER ARMY TRAINING PROGRAM (EVATP)

The EVATP was not an attempt to introduce a series of unrelated innovations into the training structure of Basic Combat and Advanced Individual Training. It was, instead, an attempt to fundamentally revise the instructional and testing structure of conventional BCT and AIT to create a more integrated and progressive 16-week training sequence. The instructional methods of lecture-demonstration-practice used in the conventional program were not generally appropriate for developing the skills of BCT and AIT. The conventional testing structure did not guarantee that, at the termination of training, all men were proficient in the subjects taught. Moreover, the conventional concept of training made no concession to the wide variation in learning aptitudes usually found in a training center.

THE SIX EVATP PRINCIPLES

To guide the development of the EVATP, reliance was placed on six learning principles. The principles were drawn from a variety of sources: psychological research on

learning, applied research on military training problems by HumRRO, and the basic concepts of instructional technology. These six principles are summaries of conclusions taken from research and practice.

(1) Performance-Based Instruction

The premise of this method of instruction is that the most effective learning occurs when the student becomes actively engaged in the process of learning. To bring the student to active participation, the purpose of instruction has to be thought of as equipping him with skills and capabilities. The subject-matter curriculum is inappropriate in this context, because it stresses what information and facts are to be presented to students to digest and memorize. Performance-based instruction translates the subject matter into the skills and capabilities that the student is to acquire as a result of instruction.

(2) Absolute Criterion

When a student has learned to perform a skill, there must be some standard against which his performance is evaluated. For self-evident reasons, partial success in performance of a skill is unacceptable. Either a student knows how to perform a skill or he does not. Under performance-based instruction, the standard is absolute. When a student is unable to perform a skill, he receives additional training until such time as he demonstrates that he is proficient in that skill.

(3) Functional Context

If the conditions for learning are arranged so that the student sees the usefulness of that instruction and can apply it in solving a problem and in relating technical information to application in a concrete setting, that instruction takes place in a functional context. For example, learning in a functional context takes place when a student sees the effect of an abstract principle in a specific and actual situation, and when a particular skill is related to its utility in solving a real-life problem. Functional context refers to the application of technical and abstract information in a situation where the student can see its importance and relation to the skill he is learning.

(4) Individualization

One of the main variables in learning is the amount of time allowed for a student to learn. Instruction that has an arbitrary time limit ignores the fact that students learn at different rates. Instruction that permits the student to learn at the rate necessary for him to acquire a skill is termed individualized instruction. The methods of individualized instruction should offer the student the opportunity to practice, repeat, and review the skill to the extent necessary for him to learn.

(5) Feedback

When the student is actively engaged in learning a skill, he has to handle, and to practice with, the instructional materials. This situation has obvious advantages to the training manager, instructor, and student. All know how the student is learning, because there is ready evidence in the nature of the student's performance. All can easily assess where the student is having problems and where additional practice and instruction are necessary. This immediate knowledge of the results of instruction is called feedback.

(6) Quality Control

A training system must have empirical evidence that the students have learned what was intended for them to learn. Through performance-based instruction, a training system has a direct means of verifying the quality of its instruction. Because students have learned skills, what they are able to do as a result of instruction is readily observable. Data on all students' performances can be gathered so that the strengths and weaknesses of the entire training system can be identified.

DESIGNING A TRAINING SYSTEM

To design a training system that would incorporate these six principles requires that priorities be established. The first priority is to identify the specific skills that men learn within a subject area. Once the specific skills are identified, they must be analyzed in terms of the tasks that comprise the skills.

The second priority is to use skills, broken down into a set of component tasks, for the program of instruction and the performance tests given at the completion of training. The performance tests specifies the sequence of steps the men must perform to show that they have acquired the skill. The tests define the conditions under which the soldier demonstrates proficiency, and they designate the standards of performance the men must attain. The program of instruction and the performance tests were essentially identical. To teach a man a skill, the tasks that comprise it must be specified. To evaluate a man's performance of a skill, the sequence of tasks he must perform also must be specified.

The third priority is to provide instructional methods that allow men to learn the skills as completely and as actively as possible. The general model for instruction is to curtail long blocks of verbal presentation, provide a succinct demonstration of the skills by the instructor, and permit men to practice and repeat the skills until they acquire them.

THE CONVERSION OF CONVENTIONAL BCT AND AIT INTO THE EVATP

The conversion from conventional BCT and AIT to the experimental program is accomplished by implementing the learning principles in six steps.

1. Shift from familiarization and orientation training to training that ensures that the trainee has acquired high-priority skills.

Much that a soldier learns throughout Basic and Advanced training consists of skills that he will use during subsequent military service. Instruction in subjects that were already oriented toward attainment of skills was left unaltered—such subjects as Rifle Marksmanship and Physical Training. Subjects that had a high verbal content were drastically revised where that content was inappropriate. The emphasis of the EVATP was to ensure that men acquired high-priority skills wherever it was possible.

2. Shift from alternate forms of standard written/performance tests using a 70% passing normative criterion to randomized performance tests that use an absolute "go/no-go" criterion.

Determining whether an individual has met a specific performance objective requires that he be tested to see whether he can, in fact, perform to an established standard. If he performs to standard, he is rated "go;" if not, he is rated "no-go." He either meets the standard or he fails to meet the standard.

The most complete test would evaluate a soldier on every skill that he had learned in the course of training. Because of time limitations in the EVATP, such an evaluation was impossible. Midway and at the end of Basic training and at the end of Advanced training, soldiers were tested by an independent testing group on a randomized selection of the skills learned in each subject area. Skills that had the *highest* priority in training were not randomized; the performance of every soldier was tested on these skills.

3. Shift from a lecture-demonstration-practice instructional paradigm to performance training maximizing hands-on experience and practice, and placing verbal presentations in relevant context.

Instruction throughout the EVATP became performance-based wherever possible; lectures were curtailed and instruction by demonstration and practice received

the greatest stress. The soldier observed a perfect model demonstrated by the instructor and then practiced until he was able to perform the skill without error. The soldier was permitted to get his hands on the equipment from the beginning of instruction.

Verbal technical information was no longer presented in large lecture blocks, but was presented at the time the soldier could see the relation of the information to the skill he was learning.

4. Shift from lock-step instruction to techniques by which the trainee can learn at his own pace, as much as is feasible.

It was not feasible, for administrative reasons, to permit a soldier to move at his own learning pace throughout the 16 weeks of training. However, it was possible to realize intrablock self-pacing. Within a block of training time, each soldier had as much time as necessary to initially learn the skills, and to be checked out by the instructor, when he felt that he had learned the skills. Soldiers who learned skills quickly were used as assistant instructors to help others until the entire group had learned the skills.

5. Shift from an instructor role of mainly presenting information to roles of demonstrating skills, organizing skill practice, and checking out all individuals at the training site to provide immediate feedback on skill acquisition.

The role of the instructor under the EVATP received new priorities: He demonstrated the skill that the soldiers were to learn, so that they could pattern their practice after his example. He presented technical information at the time when soldiers could see its utility. He was a source of feedback to the soldiers so that they knew what mistakes they were making and what to correct. Finally, he checked each soldier's performance to determine proficiency.

6. Shift from testing only at the end of BCT, to a checkout immediately after instruction, a diagnostic test midway through BCT, and an end-of-course comprehensive proficiency test.

Because the EVATP was composed of a series of discrete subjects throughout the 16 weeks of training, the quality control system had to verify not only that soldiers initially acquired the skills, but that they retained them over time. Therefore, quality control had to occur at three levels. The soldiers were checked out by instructors on all the skills they had learned during the initial block of training. Soldiers who were not proficient in the skills at that time were identified and scheduled for remedial training. During Basic Training, a randomized diagnostic test was given by an independent testing group to all companies in the fourth week. The primary purpose of this test was to identify for company cadre how much review was necessary in those skills men had learned in the first four weeks of training. A comprehensive performance test was given at the close of the Basic and Advanced phases of training. Like the fourth week test, these tests were based upon a randomized selection of skills taught throughout the phase and were administered by an independent testing group. Men who demonstrated a lack of proficiency at this time got further practice, and were retested until they demonstrated proficiency.

These periodic tests generated important information useful to training personnel at all levels. The performances of large numbers of men could be summarized to show where specific improvement was necessary in instruction, whether there was a lack of sufficient review time, and whether the entire training system was producing highly proficient soldiers.

FIELD TEST OF THE EVATP

The course objectives and performance tests used in the 16-week EVATP were determined jointly by Fort Ord and HumRRO. The U.S. Army Infantry School, the

proponent agency for BCT and AIT Infantry instruction in training centers, validated these objectives and performance tests. HumRRO assisted Fort Ord in converting their training from the conventional system to the experimental.

CONVERSION OF THE COURSE

The initial task was to plan a sequenced and integrated Program of Instruction (POI) of 16 weeks duration that would lead to the optimum qualification of the soldier in three basic skill areas: 11B MOS (Light Weapons, Infantryman), 11C MOS (Mortar Crewman), and Mechanized Vehicle Driver. Using conventional BCT and AIT programs of instruction as a guide, a new program to meet the objectives of these skill areas was outlined. The detailed structuring of the program had as its goals sequencing instruction for a successive mastery of skill areas, starting with the elementary and basic skills and ending with the more advanced and complex; integrating subject material wherever possible; eliminating redundancy, lectures, and orientation periods during instruction; and providing time for skill practice and performance testing.

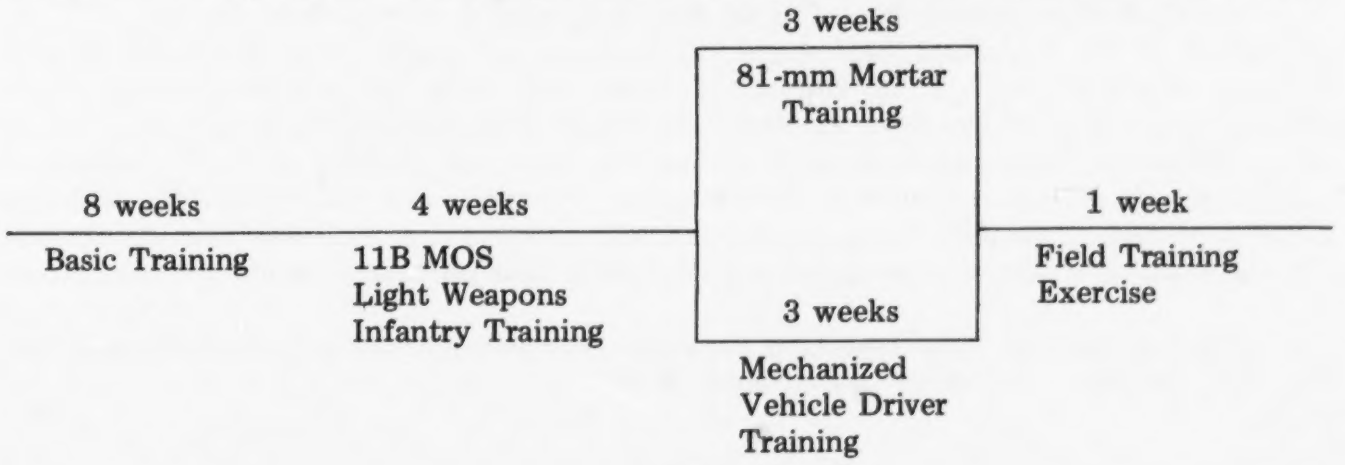
Subsequent developments in the Department of the Army personnel requirements, as outlined previously, required a definite break in training at the end of 8 weeks. The original sequencing for 16 weeks was revised to fit an 8-week Basic program and an 8-week Advanced program. In the Advanced period, the trainee could only attain the 11B MOS and one other skill area—the 11C MOS or the Mechanized Driver qualification—but not all three. In the Advanced period, there also had to be included, as a Department of the Army requirement, a field training exercise that included specified orientation subjects and tactics related to the Southeast Asia area.

CONVERSION OF SUBJECT MATTER

Each subject in the standard Program of Instruction was examined in light of its objective to determine (a) the essential skills, in priority, that would be included in instruction; (b) the time needed for skill instruction and practice; and (c) the time needed for checkout of trainee skill acquisition on a go/no-go basis.

Conversion of the conventional 8-week BCT program to a performance-based system required extensive conversion of the instructional techniques in seven skill subjects. The subjects that were inherently performance-based, such as weapons firing and physical training, were not changed except to eliminate lectures and minimize demonstration time. Orientation subjects, such as Military Justice and Code of Conduct, were unchanged.

The Advanced part of the EVATP program consisted of four weeks of Light Weapons Infantry training (11B MOS), three weeks of either Mortar Crewman (11C MOS) or Mechanized Vehicle Driver training, and one week devoted to the Field Training exercise.



In Light Weapons Infantry training, all skill subjects except actual weapons firing had to be converted to performance-based training techniques. Mortar Crewman and Mechanized Vehicle Driver training subjects, being high in skill content, were also converted where required.

The subjects converted to performance-based instruction techniques under EVATP were as follows:

Basic	Advanced
First Aid	Survival, Escape and Evasion
CBR (Chemical, Bacteriological, and Radiological)	Techniques of Fire and Tactics
Land Navigation	Communications
Guard Duty	Landmine Warfare
Rifle Functioning	M79/203 Grenade Launcher
Drill and Ceremonies	M72 LAW (Light Antitank Weapon)
Individual Tactical Training	Pistol, Cal .45
	Machinegun, M60
	Night Vision Devices
	Patrolling, Counterinsurgency
	81-mm Mortar
	Mechanized Vehicle Training
	Machinegun, Cal .50
A General Subjects Test (4th week) and a Comprehensive Performance Test (8th week) were included.	A Comprehensive Performance Test for the 11B MOS was included.

DEVELOPMENT OF PERFORMANCE TESTS

Concurrent with the revision of subjects to performance-based instruction, performance tests to measure skill performance in the essential skills were developed jointly by Fort Ord training personnel and HumRRO. Each performance test contained three essential components: (a) it specified the sequence of steps the soldier must perform to show that he had acquired the skills; (b) it defined the conditions under which the soldier must demonstrate successful performance; and (c) it designated the criterion standard that the soldier must attain.

Because of the short lead time, and in order to arrive at the behavioral objectives and a listing of essential performances, it was necessary to employ a "jury-of-experts" method instead of the formal process of systems engineering as outlined in CONARC Regulation 350-100-1.[1] The instructors and committee representatives in each subject area considered the question, "What must the soldier be able to do as a result of this instruction?"

Through their knowledge of basic job requirements of the soldier, and with the assistance of the HumRRO staff members, each jury of experts converted each of their subject objectives into a description of tasks and skills in relative priority. These descriptions served as the basis for both the content of instruction and the performance tests. Formal performance tests were written for each high priority skill. The content of each test was determined by Fort Ord training personnel, and the delineation of proper testing procedure (requirements, conditions, and performance measures) was determined by the HumRRO personnel assigned to the project. This procedure served to place proper

[1] Headquarters, U.S. Continental Army Command. *Systems Engineering of Training (Course Design)* CON Reg. 350-100-1, Fort Monroe, Va., February 1968.

emphasis on the important skills to be learned by the soldier. Material not relevant, or of such low priority that it could be learned later on the job, was eliminated from formal instruction.

After each test was fully coordinated between Fort Ord and HumRRO, it was sent by HumRRO to the U.S. Army Infantry School (the proponent agency for BCT and AIT instruction) at Fort Benning for validation. The Infantry School's validation of the tests was based upon their ongoing systems engineering of BCT and AIT (Infantry) following CONARC Regulation 350-100-1. (Samples of selected performance tests are enclosed as Appendix A.)

USE OF THE PERFORMANCE TESTS

To standardize the EVATP instruction, review, and testing, the performance tests on all subjects were distributed widely at Ford Ord. Instructors used these performance tests as the bases for instruction and checkout; Drill Sergeants used them for either review or remediation; testing personnel used them in the administration of the General Subjects, Comprehensive Performance, and MOS Tests. Gradual adoption of the concept of universal use of the performance test as a teaching and testing vehicle served to eliminate many inconsistencies in instruction, review, and testing standards.

Systematic reviews of all performance tests were undertaken jointly by Fort Ord and HumRRO shortly after their first distribution and use by the initial trainee cycles in the program. Experience gained during instruction and testing provided the basis for test revisions, most EVATP performance tests evolved through three generations.

New performance tests were not prepared for weapons firing, because firing procedures for range practice and record firing, by their inherent construction, were performance-oriented. However, all weapons instructional periods were closely examined to eliminate orientations and lectures. Formal by-the-numbers demonstration periods were held to a minimum.

A fourth-week General Subjects Test, conducted by testing personnel, covered the subjects of Drill and Ceremonies, First Aid, Land Navigation, M16 Rifle (except range firing), Guard Duty, and CBR. Because the purpose of this test was diagnostic for providing data for selecting subsequent instructional options, one test session for each soldier was considered sufficient. The soldier received feedback on his skill proficiency. It provided the trainers with a measure of the effectiveness of their instruction in General Subjects. This test also singled out those who performed very poorly; soldiers failing a large number of tests became candidates for recycling in training or transfer to a Special Training Company. For the training unit, the test results highlighted the subject areas that must receive the most review or remedial work in preparation for later testing.

An eighth-week Comprehensive Performance Test, conducted by testing personnel, covered the same subjects as the General Subjects Test, and, in addition, tested the skills learned in Individual Combat Techniques. A soldier was required to pass all given tests on a go/no-go basis to graduate from the Basic phase of training. Should he fail a subject on the initial try, he underwent repeated retraining-retesting periods until he did pass that subject. Because skills to be tested were chosen at random each day, and his retests may or may not include the item he failed initially, the soldier was required to review and practice *all* the skills to prepare for retesting in a subject he had failed. Men failing after a maximum number of retries were considered for recycling, elimination under provisions of AR 635-212, or transfer to a Special Training Company.[1]

[1] In the earlier phases of the EVATP field test, the maximum number of retries was four. Gradual refinement of the system resulted in this maximum being reduced to two, inasmuch as negligible numbers of trainees were still no-go after two retraining-retesting periods.

A 13-th week 11B MOS Test, conducted by testing personnel, was developed for soldiers in Infantry Advanced Individual Training. The test covered the subjects of Communications; Landmine Warfare; M79/203 Grenade Launcher; M72 LAW; .45 Cal. Pistol; Survival, Escape and Evasion; M60 Machine Gun; Night Vision Devices; Techniques of Fire and Tactics; and Patrolling. The individual was required to pass the given tests in each subject to qualify for the 11B MOS. If he failed to pass, the soldier was required to return for retesting in the same subject, although, again, through the randomization policy, he might have to pass different performance tests in the given subject on the retry. The soldier was allowed a maximum number of retries before he was considered for recycling in AIT Infantry.

Mortar Qualification Tests to qualify a soldier in the 11C MOS were already scheduled as integral parts of three-week scheduled instruction in the 81-mm Mortar. Award of an 11B MOS was a prerequisite to taking 11C training. The 11C tests were not randomized and the soldier was required to meet the standard in *all* tests before an award of the 11C MOS was made.

Mechanized Vehicle Driver Qualification Performance Tests were also scheduled as an integral part of three-week driver instruction. Award of the 11B MOS was a prerequisite for taking this training also. Performance tests for driving and maintaining the M-113 mechanized armored personnel carrier were not randomized; the soldier was required to meet the standard in all tests to be qualified as a mechanized vehicle driver.

There was no program for recycling those who failed 11C MOS or Mechanized Driver tests (including retries) within the three-week training-testing time period. Those few who failed had the previous award of an 11B MOS that governed their future assignment and utilization by the Army.

QUALITY CONTROL MEASURES

The EVATP Quality Control System was designed to check on skill acquisition and maintenance during the training process. It was a system of administering performance tests to trainees at specified intervals in their training to determine progress. To assure objectivity, formal performance testing was conducted by an independent group of testing personnel who were administratively separate from the training personnel. All performance tests were administered on an absolute, go or no-go basis. With a few exceptions made for mandatory skill performance, the actual test items to be administered in a given testing session were randomly chosen each day just before a training unit was administered the block of tests. The available performance data were used at all levels of training management to pinpoint strengths and weaknesses in training.

As one quality control measure, a subject-by-subject comparison of results of the General Subjects Test (fourth week) with the Comprehensive Performance Test (eighth week), for a given cycle of training, revealed strengths and weaknesses in the instructional and remedial areas. For example, Figure 1 (Land Navigation) illustrates comparative test results of first try for fourth and eighth week tests by training cycle.[1] The curve for the General Subjects Test reflects for the most part the quality of initial instruction and the thoroughness of the individual checkout. The curve for the Comprehensive Performance Test not only reflects initial skill acquisition, but also reflects the thoroughness of review and remediation on the part of Drill Sergeants and the Training Review Committee.[2] It is normal to expect an improvement in skill performance between the fourth and eighth-week tests.

[1] Each cycle consisted of five training companies, totaling approximately 750 men.
[2] A formally functioning agency that provided review prior to test administration.

In another example, Figure 2 (Drill and Ceremonies), certain weaknesses are revealed. The curve for the General Subjects Test shows a relatively low pass rate when compared to other subjects, possibly the result of conditions existing in initial instruction. The data for the Comprehensive Performance Test indicate that review and remediation, though producing considerable gain, could probably produce even more in this subject.

In Figure 3 (First Aid), there came to be very little spread between the fourth and eighth week tests, which indicated good initial instruction and checkout and thorough review. The unit pass rate in both cases is relatively high.

Note that in Figures 1 and 3, there are points where the fourth and eighth week test curves are inverted. This is a strong indicator that, for these cycles, initial instruction and checkout were thorough and subsequent review was perfunctory.

In Figure 4 (Individual Tactical Training), the data for passing the Comprehensive Performance Test show that the percentage rates of those who failed are relatively higher than for other subjects. Although there was improvement over cycles, there developed considerable variation in cycle performance, indicating the possibility of problems in both instruction and review.

Figure 5 data show progress in two subjects in the Advanced 11B program, plotted by date.[1] The initial pass rate for Communications started out high with the April cycles, improved, and remained high through the June cycles, indicating consistently good instruction and review practices. Landmine Warfare started out with a lower initial pass rate, but came to reflect improved instruction and review practices in subsequent cycles. No diagnostic test was administered during the 11B training cycle.

Figures 6 and 7 show average number of stations failed by cycle for Basic Training, and by date for Advanced Training, respectively. Both charts show a decline in the average number of performance stations failed on initial try over the period indicated. The greatest improvement took place between the first and eighth cycles of Basic Training, indicating not only an improvement in instruction and review, but most important, that the institutional change from conventional training to a performance-based system was beginning to take place. The change in 11B performance is similarly interpreted.

PROBLEMS OF INSTITUTIONAL CHANGE

The biggest single difficulty encountered was in achieving the overall institutional change required to convert from conventional training to the experimental system. It is important to understand that the role of the instructor was considerably changed under the EVATP concept. He no longer imparted knowledge from a platform, but, instead, functioned as a supervisor and organizer of skill instruction. The performance test and its performance measures became his guide in the step-by-step process of skill instruction. In employing a "checkout" system for each soldier at the end of the instructional period, the instructor ensured that the skills learned had met the prescribed standard. Under the EVATP concept, the soldier became the primary performer, actively learning skills; whereas under the old concept, the instructor was the primary performer with learning on the part of the soldier being an assumption rather than a fact. Unfortunately, orienting and briefing instructors and Drill Sergeants on the principles of a performance-based training system did not ensure that they had acquired the techniques of organizing skill-performance instruction and testing.

[1] Each point represents the performance of three training companies, or approximately 300 men.

Land Navigation: Percent Passing Initial Test by Cycle

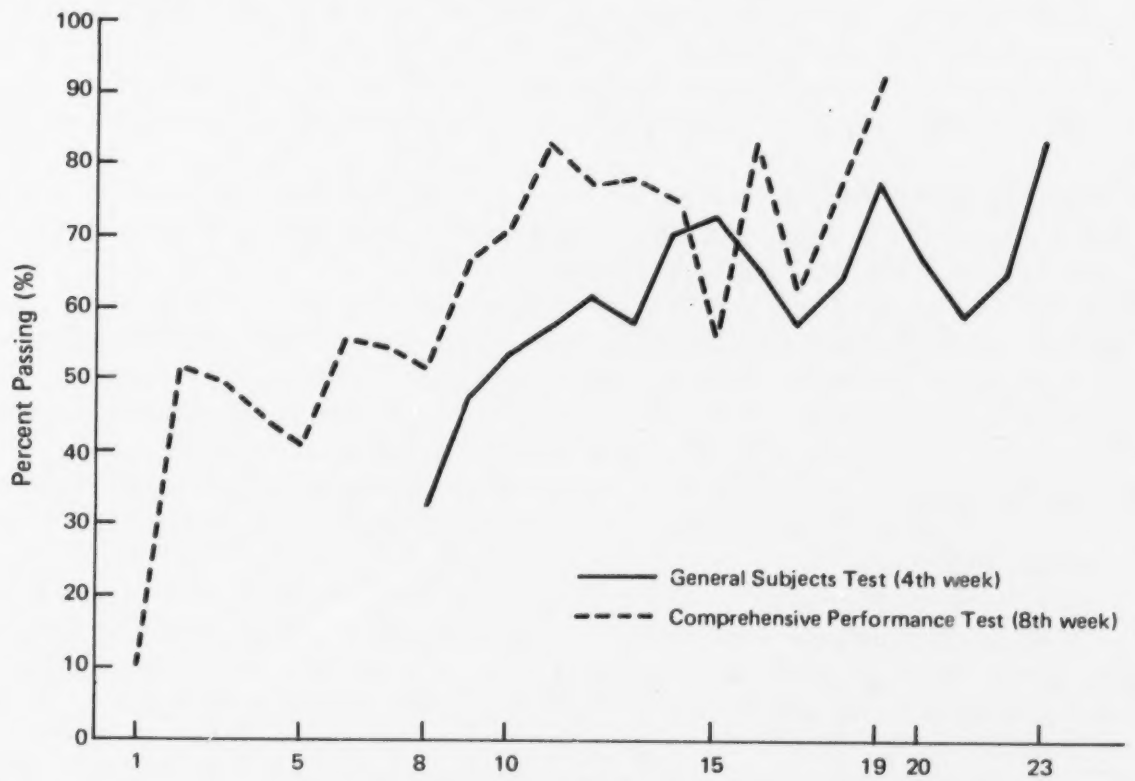


Figure 1

Drill and Ceremonies: Percent Passing Initial Test by Cycle

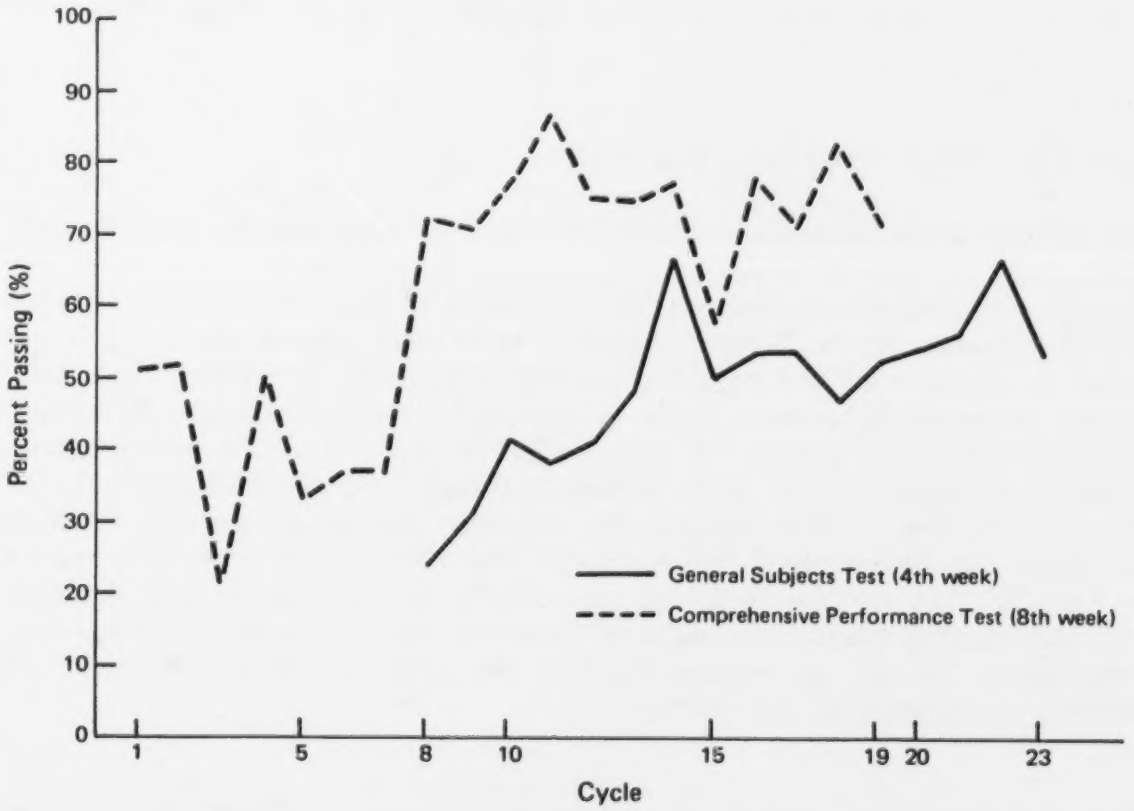


Figure 2

First Aid: Percent Passing Initial Test by Cycle

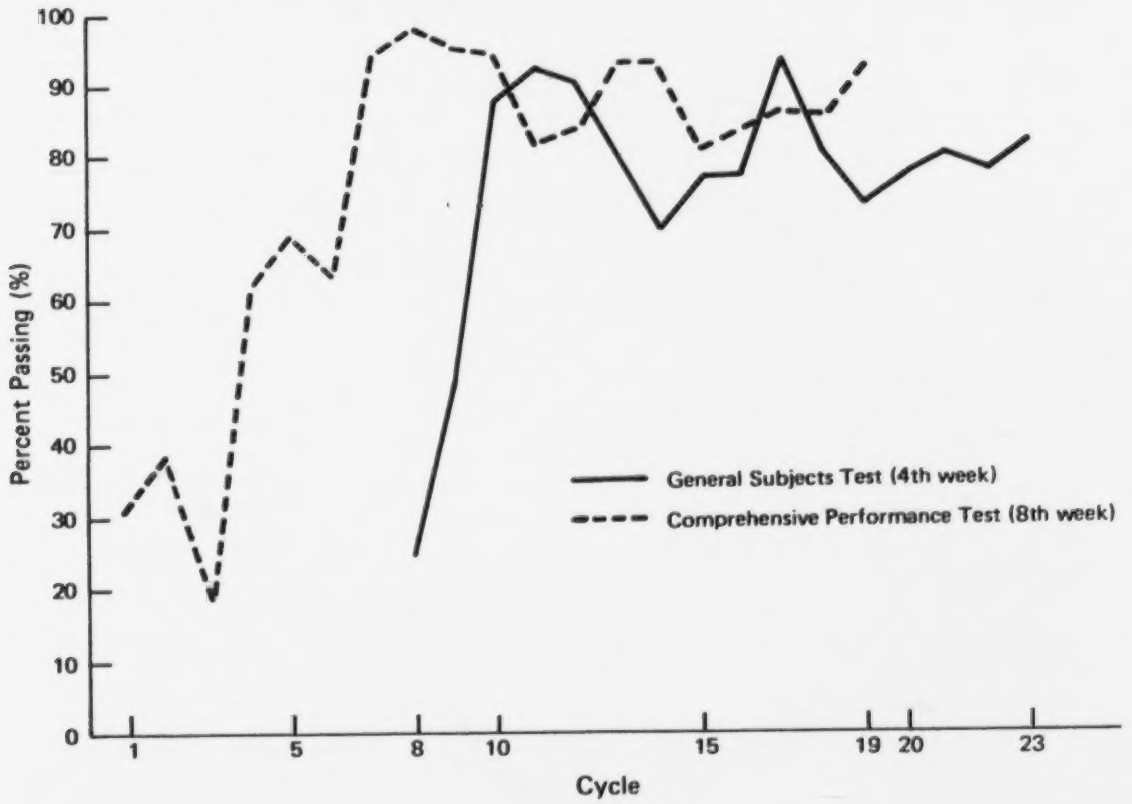


Figure 3

Comprehensive Performance Test, BCT: Individual Tactical Training: Percent Passing Initial Test by Cycle

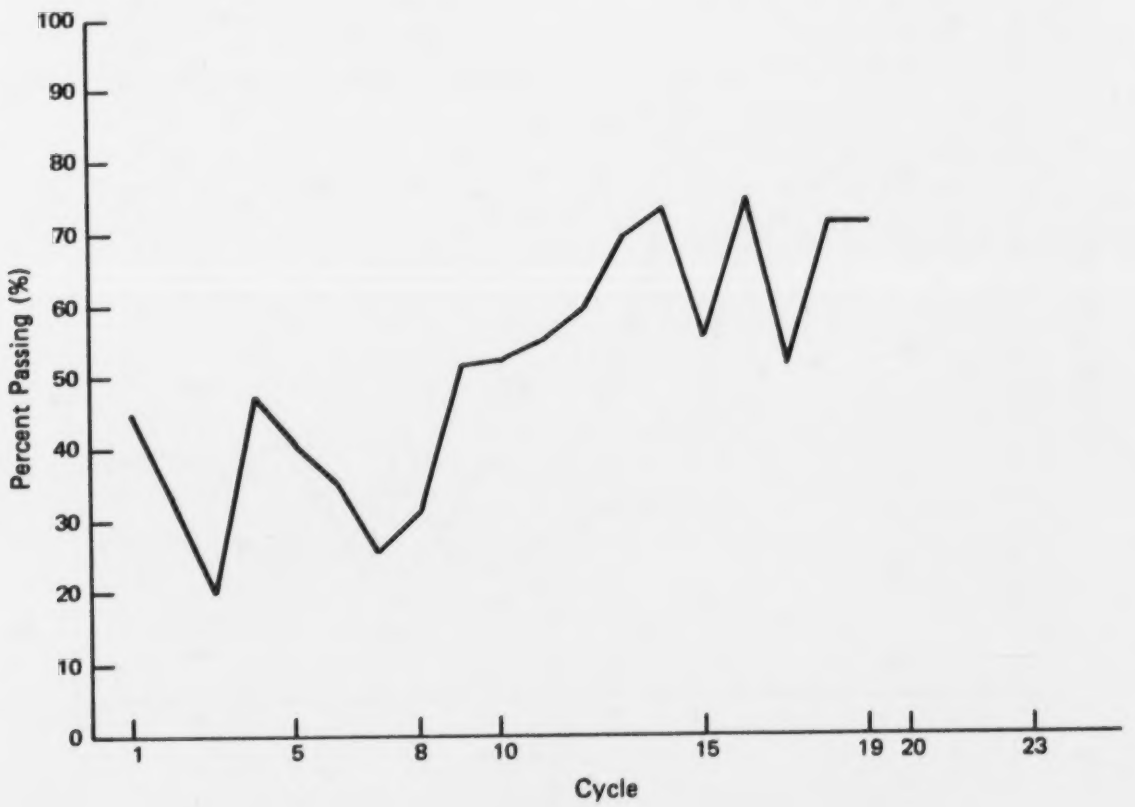


Figure 4

Comprehensive Performance Test, AIT: Percent Passing Initial Test

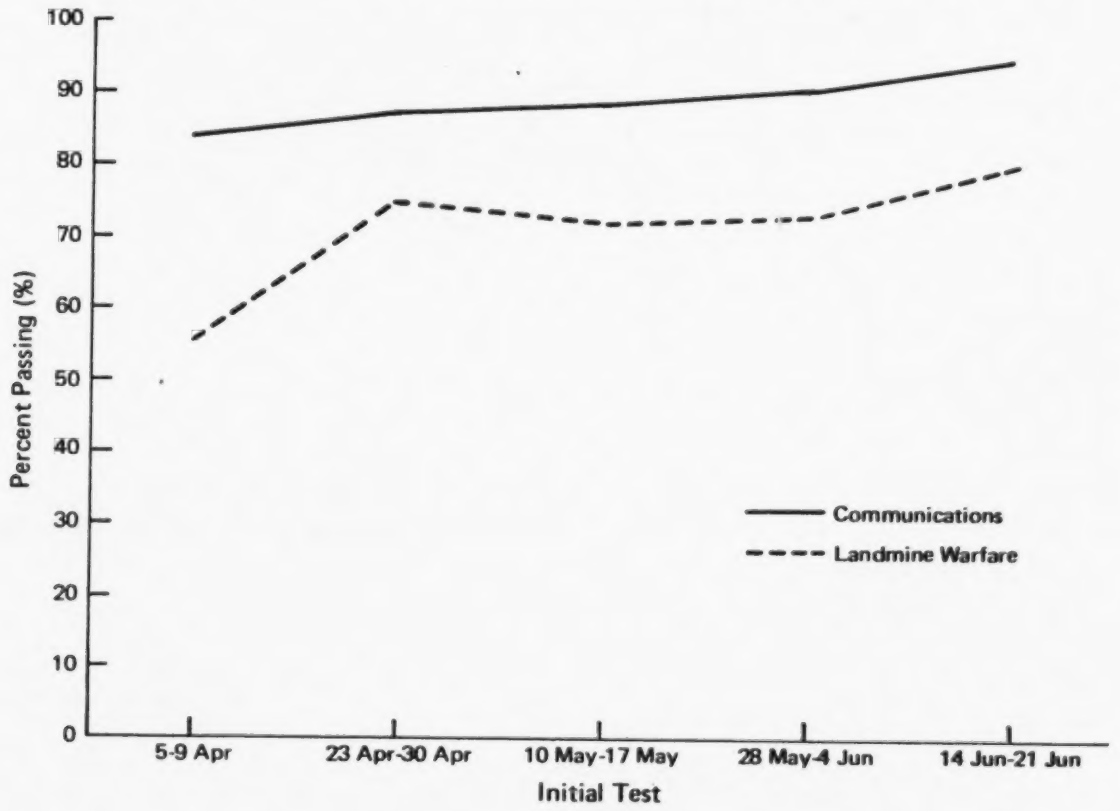


Figure 5

Average Number of Stations Failed on Initial Test by Cycle

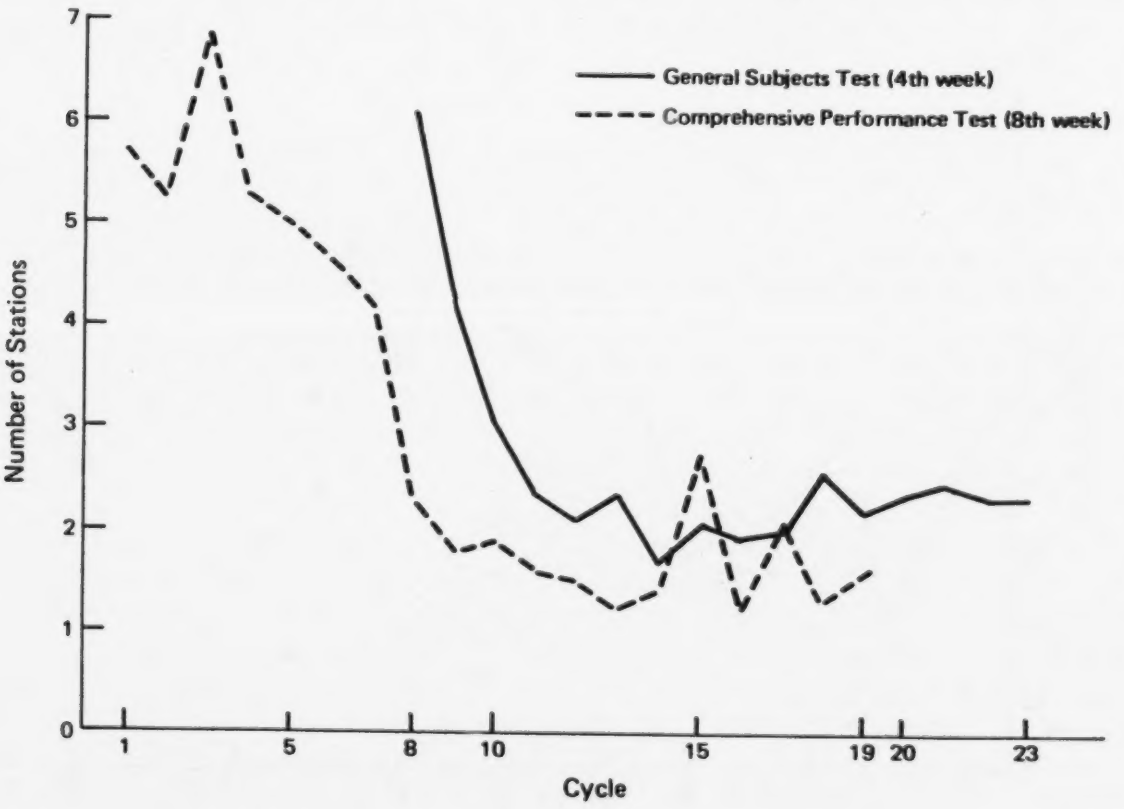


Figure 6

Comprehensive Performance Test, AIT:
Average Number of Stations Failed per Person on Initial Test

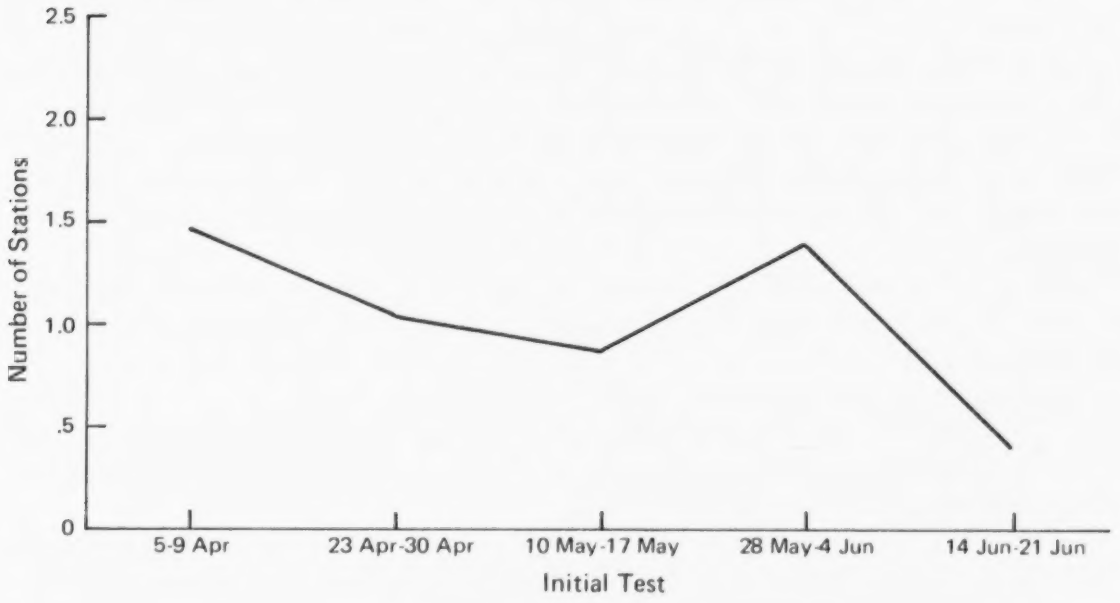


Figure 7

The original starting date for implementing the EVATP system was July 1971. A decision to move the starting date ahead to January 1971 imposed severe burdens on the training system by providing only one and one-half months of planning and development time. Consequently, conversion to the new system (development of objectives and performance tests, revision of instructional techniques and materials, and orientation of instructors and cadre) was only slightly ahead of actual instruction during the first cycle of experimental trainees. Under these conditions, it was necessary to introduce training innovations in increments as the successive training cycles passed through the system. Also, necessary revisions of the training innovations, resulting from field test, were accomplished in a series of increments.

Concurrent with the development of performance tests, the performance-oriented system was partially introduced for those trainees entering basic training on 11 January 1971. Performance tests had to be prepared for early subjects first so that they could be utilized for instruction. Performance tests for later-occurring subjects were prepared and introduced into training by increments for subsequent training cycles. There was no time for small-scale field tryout of any test before its use.

A program of indoctrination of instructors in the principles and techniques of the new training system was inaugurated concurrent with the phasing-in of new instruction. This program was also extended into the troop commands to include unit Drill Sergeants who had responsibility for review and remediation in all subjects and basic instruction in others.

All cycles under the EVATP, beginning with the first, were tested with the go/no-go absolute test criteria. This resulted in an extremely high first-try failure rate for the first several cycles on the Basic Comprehensive Performance Test. In examining the reasons for this initial high failure rate, it became apparent that the principles of the new system were not in effect for a number of reasons: instructor resistance to change; inability of instructors to give up old lesson plans and platform techniques and go to techniques of performance-oriented methods; lack of knowledge of performance standards; and, mainly, the requirement for too many new things to happen simultaneously with too little planning time. The inertia, or resistance to institutional change, had yet to be overcome.

This resistence was overcome by having teams of HumRRO representatives and Fort Ord officers begin working directly at the instructor-soldier level to translate the previous indoctrination briefings into specifics for action, and to demonstrate how to put the EVATP principles into operation during actual instruction on site. General Subjects, such as First Aid, CBR, Guard Duty, and Land Navigation, were given detailed attention first. Once these subjects were fully converted to performance training, these classes served as practical guides for the instructors and supervisors of other subjects in the reshaping of their respective instructional blocks. These HumRRO-Ord representative teams continued to work closely at the instructor-soldier level until all subjects in the 16-week program were covered.

During field visits at the instructor-soldier level, the following instructional techniques were emphasized and reemphasized to complement the implementation of the EVATP principles:

(1) Elimination of lecture periods.

(2) Use of short demonstration periods—soldiers to participate if possible.

(3) Maximum practice time for soldiers in acquiring a skill—"hands-on" training with equipment or practice in performing.

(4) Thorough instructor "checkout" of soldiers to ensure *each* has learned the skill—performance test standards and performance measures had to be followed.

(5) Use of fast learners to assist the slow.

(6) Participation of Drill Sergeants to assist Instructor Cadre in instruction, checkouts, and remediation.

The process of reorienting instructors to the EVATP principles actually began when they became involved in the techniques of organizing skill instruction. Through a constant exchange of viewpoints, recognition of their professional competence as instructors in military subjects, and a practical approach to alleviating administrative problems, these teams gradually achieved the instructors' understanding of "what was wanted." Training staff and supervisors were concurrently educated in the new techniques through the above process, their assistance and initiative then being utilized toward conversion of subsequent subject material to the EVATP system.

The staff of the Instructor Training Course and Drill Sergeant School at Fort Ord was also given assistance in reorienting and revising their instruction.

ILLUSTRATIONS OF THE PROGRESS OF INSTITUTIONAL CHANGE

Beginning with the first cycle of soldiers through the EVATP, data were collected on their performance in the eighth and 13th week tests. Where Figure 8 shows a high failure rate registered by the first cycle on their first try and retest efforts, improved instruction, review, and remediation began to show progress by the fifth cycle. After the system was in operation for ten cycles, nearly all trainees were passing completely by the end of the second retest. Data for the 19th cycle showed little improvement over the 10th. Apparently the EVATP was functioning well after 10 cycles.

Somewhat different data compiled in Figure 9 for the eighth week test, show a corresponding drop in the percentage failing "X" stations on initial try for the first and succeeding cycles. For the first through the fifth cycles, there was little change in the number of performance stations being failed; however, the 10th and 19th cycles show a distinct reduction, indicating the new techniques following EVATP principles had started to produce results.

The General Subjects Test (fourth week) was placed into operation beginning with the eighth cycle of trainees. Figure 6 shows performance on initial try for the eighth and

Comprehensive Performance Test, BCT:
Cumulative Percent Passing After Each Test

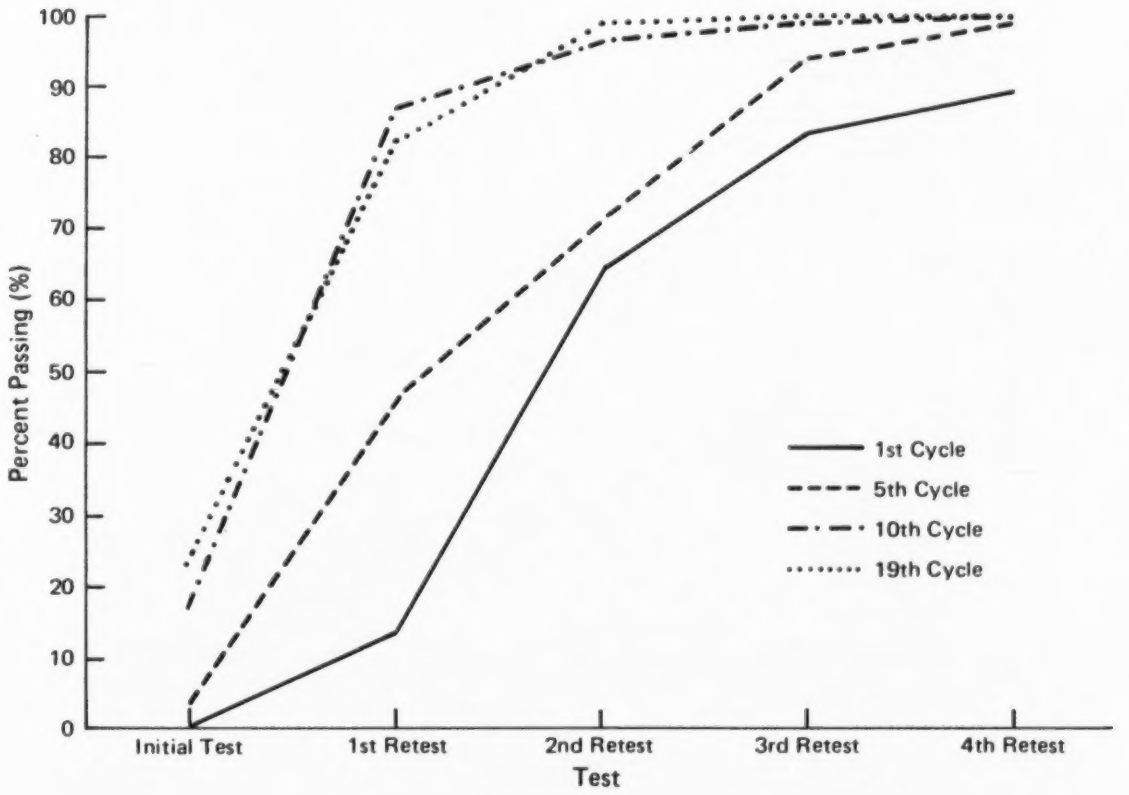


Figure 8

following cycles and compares it with the performance of trainees on the Comprehensive Performance Test. Here, too, one observes gradual improvement reflecting the accomplishment of change over cycles. Note that introduction of the fourth-week test was accompanied by a significant improvement in the eighth-week test performance.

Figure 10 shows the progress made by successive cycles in the 11B Comprehensive Performance Test (13th week) in percentage failing "X" stations on the initial try. This is a reflection of institutional change in instruction; however, the changes are less marked than in Basic, as Drill Sergeants and trainees were previously exposed to the new system during their basic cycles.

The quality control data presented here are examples of the material monitored during the EVATP at Fort Ord. Data can be kept on the basis of performance in each subject or by unit performance in all tests. If desired, data on performance in each sub-skill could be monitored. These data, compiled for each trainee, beginning with his performance in each period of instruction and continuing throughout his entire training-testing program provide a quality-control vehicle of benefit to trainees, instructors, and managers at all levels.

Gradual conversion to the complete EVATP system was accomplished over approximately a four-month period. As trainees passed through the system in successive cycles, they underwent larger proportions of performance-based instruction, they received instruction from instructors and unit cadre who were more proficient and motivated in conducting such instruction, and they were tested under the new go/no-go criterion, which was understood better and applied more realistically. Continual tracking of performance data demonstrated clearly that improved trainee performance dramatically reflected this gradual accomplishment of institutional change.

Comprehensive Performance Test, BCT:
Percent Failing "X" Stations on Initial Test

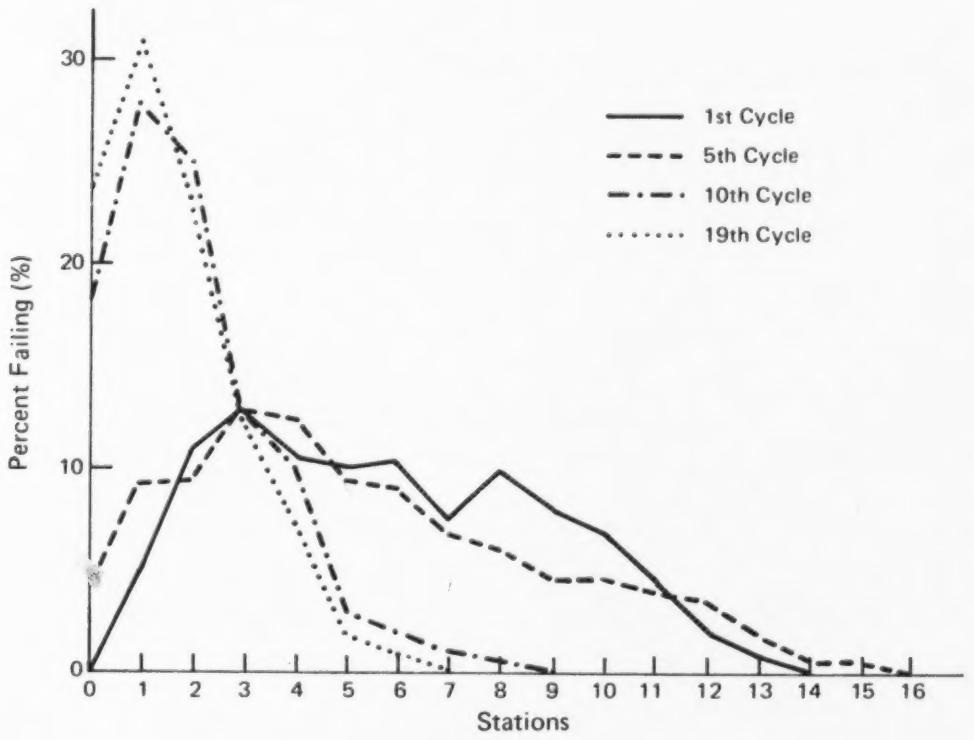


Figure 9

Comprehensive Performance Test, AIT:
Percent Failing "X" Stations on Initial Test

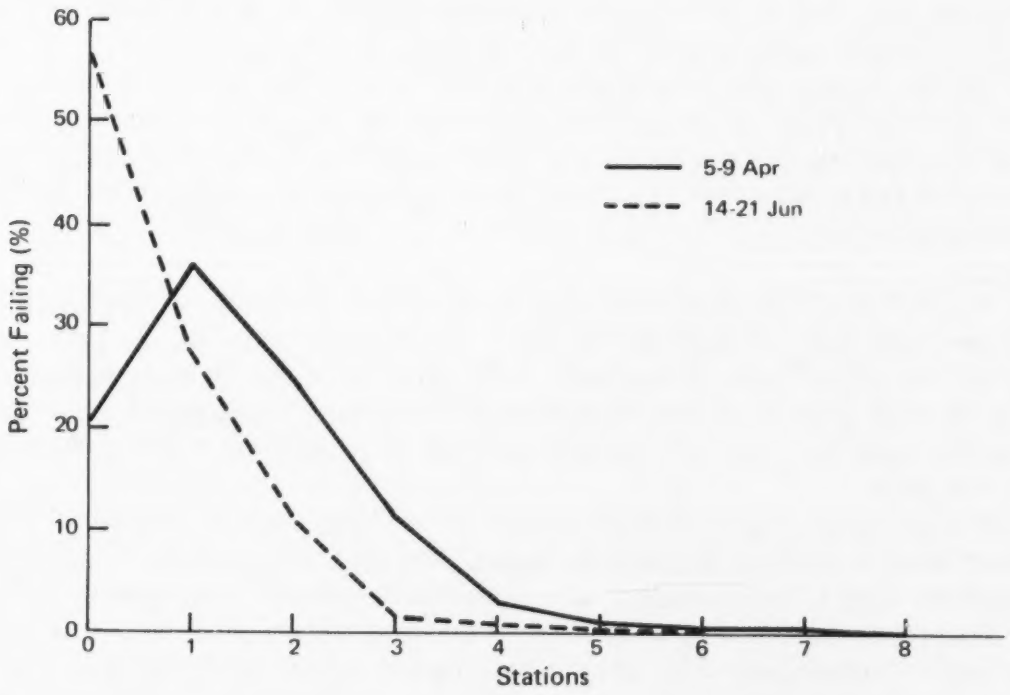


Figure 10

PERFORMANCE COMPARISON OF THE EVATP WITH CONVENTIONAL TRAINING[1]

SUMMARY OF THE ORD-JACKSON PERFORMANCE TEST RESULTS

During June 1971, the Infantry School at Fort Benning, serving as an independent agency, administered performance comparison tests at Fort Ord and Fort Jackson in selected subjects. The tests were prepared solely by the Infantry School, after HumRRO and the School jointly agreed upon what BCT and AIT subjects should be tested. HumRRO's responsibility was to prepare a summary and an evaluation of the results.

BCT Comparison Tests

The test samples consisted of men sent from the Midwest to both training centers in order to prevent any regional differences influencing the comparison evaluation. From the standpoint of distribution by mental category, the samples were almost identical; the differences in the distributions were insignificant. Table 1 summarizes the overall performance differences between soldiers trained under the EVATP and the conventional program.

Table 1

Summary of EVATP and Conventional Program Performance Differences (BCT)

Subjects	Percent Passing All Requirements		p[a]
	EVATP	Conventional Program	
First Aid	47	.5	<.001
Land Navigation	41	7	<.001
M-16 Weapon Maintenance	38	18	<.001
Guard	90	78	<.001
ITT	46	39	NS
Drill and Ceremonies	14	11	NS
CBR[b]			
Masking Drill	64	18	<.001
Decontamination	88	61	<.001
Nuclear Protection	85	50	<.001
Nerve Gas Treatment	86	32	<.001

[a]Statistical significance of the difference between the programs.

[b]Administrative test difficulties made it impossible to ascertain percentage of Fort Ord men passing all requirements.

[1] See Appendix B for a full report on the comparison between EVATP and conventionally trained men.

In the five subjects, the reorientation of training toward performance instruction and testing produced a soldier with a superior level of skill attainment when compared to his conventionally trained counterpart.

Because men of higher mental aptitudes were distributed in similar proportions at Fort Ord and Fort Jackson, the superior performance of the EVATP men was not attributable to disproportionate representation of high aptitude men. The differences were also not attributable to a significantly higher percentage of overall superior performance by high-aptitude men over low-aptitude men at Fort Ord. Differences among performances by the EVATP men at Fort Ord in different mental categories were not statistically significant.

When performances by men in each mental category were compared by posts, they were in line with the overall performance differences. In general, men in each mental category who were trained under the EVATP performed in a superior fashion to men in the same mental categories who were conventionally trained.

AIT Comparison Tests

Graduates from Fort Jackson's eight-week program in 11B MOS were compared to graduates of Fort Ord's four-week program in the same MOS. Additionally, three-man crews with the 11C MOS from both posts were compared in terms of their performance skills with the 81-mm mortar. Superior performance was demonstrated by men trained under the EVATP in seven of the eight 11B subjects. The performance differences between mortar crews at Fort Ord and Fort Jackson were inconclusive. Table 2 summarizes the overall performance differences.

Table 2

Summary of EVATP and Conventional Program Performance Differences (AIT)

Subjects	Percent Passing All Requirements		p[a]
	EVATP	Conventional Program	
11B			
M79 and M203 Grenade Launcher	98	61	<.001
M72 LAW (Light Antitank Weapon)	82	1	<.001
M60 Machinegun	34	10	<.001
NVD (Night Vision Device)	9	0	<.001
Landmine Warfare	44	7	<.001
Communications	52	20	<.001
Land Navigation	71	21	<.001
.45 Caliber Pistol	87	85	
11C			
81-mm Mortar	26	24	

[a]Statistical significance of the difference between the programs.

The results indicate that the reduction of 11B training to a four-week period had no adverse effect on the level of proficiency reached by EVATP soldiers. In general, the experimental 11B program produced soldiers with a higher degree of skill proficiency in the subjects tested within a shorter period of instructional time.

At Fort Ord, 11C MOS training had been reorganized into a three-week program. This reorganization made it possible for EVATP men to acquire both the 11B and 11C MOS; it had no harmful effects on the performance levels attained by men at Fort Ord. Their performance equaled the performance of conventionally trained men.

The samples of men used for the 11B tests at both training centers were not controlled as regards mental category or geographic distribution. The men tested had been assigned routinely to either Fort Ord or Fort Jackson for training. The effect of geographic distribution cannot be estimated.

The test samples regarding the Armed Forces Qualification Tests (AFQT) distribution were examined; the findings showed that they were not equivalent. More Category I and II men were tested at Fort Ord, while more Category III and IV men were tested at Fort Jackson.

The overall performance superiority of men at Fort Ord cannot be attributed to the influence of the disproportionate number of men in Categories I and II. In fact, the data support the conclusion that Category I and II men at Fort Ord did not perform at a level significantly higher than men in the lower mental category levels. Inspection of the data shows that performance differences among men in each mental category were in line with overall performance differences between training centers. Category I and II men at Fort Ord generally performed in a superior fashion to men trained at Fort Jackson. The same held true for men in Category III and Category IV.

EFFECT OF MENTAL APTITUDE ON SUCCESSFUL PERFORMANCE

An important question that the experimental program had to acknowledge concerned the effect of the EVATP on men of various mental aptitudes: Did EVATP men of higher mental aptitude perform more successfully than the men in lower mental categories? To answer that question, information was collected on the performances of approximately 1200 men in 10 companies on the EVATP Comprehensive Performance Test given at the completion of Basic Training at Fort Ord. The AFQT scores of these men were collected from records, and the men were assigned to one of the five mental categories. For statistical purposes, men were grouped into three divisions: Category I and II; Category III; and Category IV and V.

Table 3 shows the percentage of men passing the EVATP Comprehensive Test by mental category group on the first trial. A statistical test was applied to see whether the number of men passing was significantly different among mental categories. The difference proved to be significant. Mental category did have a significant effect on successful first-trial performance. Men in the higher mental categories attained a significantly higher level of performance than men in the lower categories.

Table 4 shows the cumulative number and percentages of men who passed the Comprehensive Test on the first *or* the second trials. The statistical test again demonstrated that mental aptitude had an effect on successful performance. The higher the mental category, the more instances of successful performance.

To illustrate how the EVATP functions to guarantee that all men leaving the training system meet a minimal level of proficiency, a broader perspective was employed. Table 5 summarizes the cumulative number and percentage of men in a selected block of cycles who passed after their third trial on the Comprehensive Performance Test. The

Table 3

Men Passing EVATP Comprehensive Test on First Trial, by Mental Category[a]

Category	Percent Passing	Number Passing	Total Tested
I and II	27	117	431
III	16	90	546
IV and V	11	28	244

[a] $\chi^2 = 23.8; df = 2; p < .001$.

Table 4

Cumulative Number of Men Passing EVATP Comprehensive Test After First or Second Trial[a]

Category	Percent Passing	Number Passing	Total Tested
I and II	84	360	431
III	77	421	546
IV and V	71	173	244

[a] $\chi^2 = 15.14; df = 2; p < .001$.

Table 5

Men Passing EVATP Comprehensive Performance Test on Third Trial

Cycle	Total Tested	Number Passing	Percent Passing	Number Failing
17	718	712	99.2	6
18	732	732	100.0	0
19	706	706	100.0	0
20	722	717	99.3	5
21	694	691	99.6	3
22	699	695	99.3	4
23	728	727	99.9	1
24	750	750	100.0	0

total number of men tested was 5,749. Of the total number, only 19 (less than .04%) were unable to pass the BCT comprehensive test after their third trial.

The effect of mental category on learning EVATP performance skills enabled men of the higher categories to achieve success with fewer trials than those with lower aptitude. Men having lower aptitudes eventually achieved the same level of performance, although they required more review and remediation to perfect their repertoire of skills.

Because the EVATP men were evaluated under an absolute criterion—they either could or could not perform a skill—they were tested, retrained, and retested until they could perform the skills specified in each subject area. Thus, the practical effects of mental category were mitigated by the structure of EVATP performance testing.

DISCUSSION AND CONCLUSIONS

When there is a large-scale conversion from one training system to another, an initial period of confusion and dissonance results. In this instance, training personnel and company cadre were introduced to a barrage of new concepts. Routines were broken and

men had to learn to function in new roles. They had doubts about their ability to operate in the new roles and about the feasibility of the new training system. At the beginning, instructors and cadre attempted to dilute the impact of the new concepts by translating them into familiar training ideas. They tried to adapt to the new system with minimal displacements of usual routines.

The problems encountered in effecting massive institutional change in the ATC context are formidable. A large-scale conversion from one training system to another is a gradual process. Of the several components of the ATC training system that must change, by far the most resistant are instructor and cadre attitudes. There exists a basic reluctance to depart from familiar instructional techniques and ideas.

From the comparison test results made during June between a conventional training program and the EVATP, superior performance by EVATP men could be attributed to three factors: redirection of the training system toward acquisition of skills; redirection in training methods toward active practice, repetition, and review; and establishment of an integrated system of performance tests, verifying that skills were mastered and retained throughout the training phases. Furthermore, these redirections of the training and testing system did not require major additions in personnel and physical resources. More instructors were not needed. The training sites could easily accommodate the performance methods of instruction. Conventional testing sites could handle the new performance tests with only minor dislocations and new resources.

A performance-based training system that integrates Basic and Infantry MOS training can be implemented within an ATC's normal operating resources. It produces graduates with higher levels of demonstrated skill proficiency than does the conventional system.

The results of the performance test comparisons between the conventional and experimental programs also lead us to conclude that the reduction of training time did not handicap the EVATP soldier in learning the skills he needs for military service and combat. In most instances, his skill level was superior to his conventionally trained counterpart. In all instances, he was the equal of the conventionally trained man.

The system permits the attainment of higher levels of skill performance within the same or shorter time frames.

The way the training system was structured permitted men in all mental categories additional opportunities to acquire and practice skills. The review periods served to help all men retain the skills they had learned. The emphasis on performance tests increased the likelihood that men initially mastered the skills and retained them throughout the phases of training. At the same time, the data showed there is an aptitude effect. The higher the aptitude, the fewer the trials needed for successful performance. But the testing structure permitted men in the lower categories the additional time they needed for practice and review. Thus, they were able to achieve the high performance standards.

Performance-based training permits high achievement by low- and high-mental category personnel. The system tends to attenuate achievement differences attributable to aptitude level.

The information that was shown on the performance of seven selected cycles of BCT companies supports the conclusion that the absolute go/no-go criterion can be met by the overwhelming majority of men. Of 5,749 men who were tested, for example, only 19 were unable to meet the performance standards after three trials. The changeover to such a testing system posed no serious strain on the testing resources that were available at Fort Ord.

In such a testing system, the use of an absolute go/no-go criterion of skill proficiency is feasible and administratively practicable.

One of the important ingredients missing in the conventional system is a means to let training managers, instructors, cadre, and men know how well instruction is proceeding. By conversion to performance instruction in crucial skills, managers, instructors,

cadre, and the men, themselves, had immediate knowledge of the efficacy of instruction. The men had the necessary referents to correct and improve their own learning. The instructors had the means to see how well the group was learning and to isolate those men who had learning problems. The company cadre learned from the test results what subjects needed review for the entire company, and for specific individuals.

The entire system of instruction and testing provided the managers of training with information on the working of the system. The individual performances of all men were collected and summarized into a series of charts and graphs. These data offered a means to pinpoint areas that could be improved and those that were functioning correctly. The data were an invaluable aid in gaining an overall picture of the quality of the training.

The system provides a means for frequent assessment of the development of skill proficiency:

(1) Feedback of this information during instruction to trainees and trainers provides an important feedback loop missing in the conventional system.

(2) Close monitoring of the available performance data by training managers at all levels provides a quick-response, quality-control system whereby strengths and weaknesses in any component of the training system can be pinpointed.

APPENDICES

Appendix A

SAMPLE PERFORMANCE TESTS

STOP THE BLEEDING BY PRESSURE DRESSING, ELEVATION, AND DIGITAL PRESSURE POINT/DRESS THE WOUND

Test Situation:	"The man next to you is conscious. He has no fractures, but there is a bleeding wound on his extremity (examiner states exact location)."
Test Condition:	Casualty with simulated bleeding wound on his extremity (as examiner stated in Situation).
Necessary Equipment:	Dummy or another solider to act as a casualty; first-aid dressing; cover.
Performance Measure 1: (optional as per test condition)	The soldier uncovers the wound by lifting away the clothing, taking the following safeguards: a. he does not touch the wound with his hands in the process of examination; b. he does not drag the clothing over the wound; c. he does not attempt to clean the wound.
Performance Measure 2:	The soldier applies pressure dressing: a. he opens the dressing and ensures the soft, thick center touches nothing except the wound; b. he places the opened dressing over the wound and exerts firm, evenly distributed pressure on the dressing with the palm and fingers of the opened hand.
Performance Measure 3:	The soldier raises the injured extremity higher than the rest of the casualty's body while exerting pressure on the dressing.
Performance Measure 4:	The soldier asks the casualty to apply pressure on the appropriate digital pressure point. The soldier may apply this pressure himself.
Note:	The soldier shall not fail if he reverses the sequence of Performance Measures 3 and 4.
Performance Measure 5:	The soldier continues to exert pressure and maintain limb elevation and apply pressure on the digital pressure point until the bleeding has stopped, or for at least 2-3 minutes.
Note:	The examiner announces, "The bleeding has now stopped. Take further appropriate action."
Performance Measure 6:	The soldier protects the wound by wrapping the tails of the dressing around the edges and tying the tails.

STOP THE BLEEDING BY PRESSURE DRESSING, ELEVATION, AND DIGITAL PRESSURE POINT/DRESS THE WOUND *(Continued)*

Performance Measure 7: (optional)	The soldier treats the patient for shock: (the order in which steps a, b, and c are performed is optional). a. he elevates both legs 6 to 8 inches; b. he loosens clothing and removes pack, if present; c. he wraps the casualty with available cover.
Note:	Performance Measure 7 is optional in this test situation. The soldier who omits it does not fail.

M16A1 RIFLE ASSEMBLY PERFORMANCE TEST

Test Situation:	"Assemble your weapon and perform the functions check."
Test Condition:	The soldier has an M-16A1 Rifle broken into three groups: upper receiver, lower receiver, and bolt carrier. The bolt carrier group is disassembled. The extractor is not removed.
Necessary Equipment:	M-16A1 Rifle.
Performance Measure 1:	The soldier assembles the bolt carrier group as follows: a. Replace bolt in bolt carrier. b. Replace cam pin. c. Replace firing pin. d. Replace firing pin retaining pin.
Performance Measure 2:	The soldier assembles the three main groups; upper receiver, lower receiver, and bolt carrier group, and replaces the sling.
Note:	Sling may be pulled tight or left loose according to individual preference. The soldier has five minutes to assemble his weapon.
Performance Measure 3:	The soldier cocks the weapon and puts the selector lever on safe. He attempts to fire. Note: The hammer should not fall.
Performance Measure 4:	a. The soldier places the selector lever on semi, and attempts to fire. Note: The hammer should fall. b. Holding the trigger to the rear, the soldier cocks the weapon, releases the trigger, and attempts to fire. Note: The hammer should fall.

M16A1 RIFLE ASSEMBLY PERFORMANCE TEST *(Continued)*

Performance Measure 5:

a. The soldier places the selector lever on auto. He cocks the weapon and attempts to fire.

Note: The hammer should fall.

b. Holding the trigger to the rear, he cocks the weapon. He releases the trigger and attempts to fire.

Note: The hammer should not fall.

GUARD: INSPECTING OFFICER PERFORMANCE TEST

Test Situation: "You are a guard and will be inspected by the Officer of the Day. Your special orders are to allow no one on your post without the proper authority. It is during daylight hours. Take appropriate action."

Test Condition: Soldier, with his weapon at sling arms, is walking guard. Soldier is approached by OD who plans to inspect soldier.

Necessary Equipment: Rifle for the guard; OD arm band for the inspector.

Performance Measure 1: On the approach of the OD, the soldier will:

a. Stop walking and come to attention.
b. Render hand salute with weapon remaining at sling arms and hold salute.

Note: The OD returns the salute.

Performance Measure 2: The soldier will:

a. Execute order arms from hand salute.
b. Come to port arms and hold it.
c. Answer such questions as OD may ask him.

Note: OD tells guard to "CARRY ON."

Performance Measure 3:

a. Execute sling arms from port arms.
b. Render a hand salute and wait for the OD to return it.
c. Come to order arms.
d. Right or left face toward the direction of walking and resume walking post.

LANDMINE WARFARE EMPLACING AND ARMING THE CLAYMORE MINE PERFORMANCE TEST

Test Situation: "Emplace, arm, and fire the Claymore mine." The enemy is to your front.

LANDMINE WARFARE EMPLACING AND ARMING THE CLAYMORE MINE PERFORMANCE TEST *(Continued)*

Test Condition:	The soldier will be given the test at a testing area where the examiner can observe his actions individually. The soldier will have a clear area in which to set up the mine. Soldiers waiting to be tested will wait in a holding area. They should not observe the actions.
Necessary Equipment:	One complete M-18A1 Claymore mine with a M-40 test set. One wooden stake.
Performance Measure 1:	The soldier places the M-57 firing device in his pocket with the safety dial on the "safe" position.
Performance Measure 2:	The soldier sets up the legs and points the "Front Towards Enemy" side toward his front. He then aims the Claymore towards the enemy using the Claymore sighting device.
Performance Measure 3:	The soldier anchors the electrical wire approximately one meter back from the blasting cap to a stake in the ground.
Performance Measure 4:	a. The soldier removes the priming adapter from the fuse well. b. He slips the electrical wire through the slit in the priming adapter. c. He inserts the blasting cap into the fuse well. d. He screws the priming adapter over the fuse well.
Performance Measure 5:	a. The soldier moves back at least 16 meters behind the mine. b. He tests the M-57 firing device by connecting the M-40 test set to it and depressing the handle while watching for the light.
Note:	The light should glow.
	c. He tests the firing wire by connecting the wire to the M-40 test set and depresses the handle of the firing device, watching for the light in the test set.
Note:	The light should glow.
Performance Measure 6:	a. The soldier disconnects the M-40 test set. b. He connects the M-57 firing device to the firing wire, making sure that the safety dial is in the "safe" position.
Performance Measure 7:	The soldier fires the Claymore mine by moving the safety dial to the "fire" position and squeezing the firing device handle.

MECHANIZED TRAINING: ARMORED PERSONNEL CARRIER M113A1, ENGINE STARTING PROCEDURE PERFORMANCE TEST

Test Situation:	"You have performed the before operations maintenance services for your APC. Start the engine using the checklist provided."
Test Condition:	The soldier is seated in the driver's compartment of the APC located in the track park.
Necessary Equipment:	Armored Personnel Carrier M113A1.
Performance Measure 1:	The soldier applies and locks brakes by pulling back on steering levers and depressing the brake lock buttons on top of the hand grips.
Performance Measure 2:	The soldier puts the transmission in neutral by placing the range selection shift lever in neutral range, in the "N" position.
Performance Measure 3:	The soldier visually inspects the switches to the lights and radios to insure they are in the OFF position.
Performance Measure 4:	The soldier turns the master switch handle ON by pulling out on the handle and turning it to the vertical ON position.
Performance Measure 5:	The soldier visually ensures that the master switch ON indicator light is ON.
Performance Measure 6:	The soldier visually ensures that the battery generator indicator needle is in the red or yellow zone.
Performance Measure 7:	The soldier visually ensures that the fuel quantity indicator indicates that there is sufficient fuel for operation.
Performance Measure 8:	The soldier pushes in the fuel cut-off control.
Performance Measure 9:	The soldier presses the starter to start the engine.
Performance Measure 10:	The soldier: a. depresses the accelerator until the tachometer reads between 800-1000 RPM, b. pulls the hand throttle control out until it will maintain 800-1000 RPM, and c. turns the control clockwise to hold the setting.
Performance Measure 11:	The soldier visually rechecks the battery-generator indicator to ensure that the indicator needle is in the yellow or green zone.
Performance Measure 12:	The soldier visually checks the engine coolant temperature indicator to ensure that the indicator needle is in the green zone.
Performance Measure 13:	The soldier visually checks the differential oil high temperature warning light to ensure that it is not on.

MECHANIZED TRAINING: ARMORED PERSONNEL CARRIER M113A1, ENGINE STARTING PROCEDURE PERFORMANCE TEST *(Continued)*

Performance Measure 14:	The soldier visually checks the transmission oil high temperature warning light to ensure that it is not on.
Performance Measure 15:	The soldier visually checks the engine oil low-pressure warning light to ensure that it is not on.
Performance Measure 16:	The soldier will, after operating engine for 2-3 minutes, decrease engine speed by turning the hand throttle control counterclockwise and pushing it in.

Appendix B

SUMMARY AND EVALUATION OF THE FORT ORD-FORT JACKSON JUNE 1971 PERFORMANCE TESTS COMPARISON

INTRODUCTION

The Office of the Special Assistant for the Modern Volunteer Army (OSAMVA) requested that HumRRO provide technical and advisory service at Fort Ord on the experimental training program. OSAMVA also requested that HumRRO evaluate the effectiveness of the EVATP. One of the means for evaluating the EVATP that was decided upon by HumRRO and OSAMVA was to compare graduates of the experimental Basic Combat Training (BCT) and Advanced Individual Training (AIT) programs at Fort Ord with graduates of conventional programs at another training center. Since Fort Jackson was to serve as a control post against which to measure life-style innovations instituted at other posts, it was designated as the control in the EVATP comparison test.

Because HumRRO has been intimately involved with the EVATP at Fort Ord, it was agreed that another agency should prepare the performance tests and do the actual administration. The Infantry School was the appropriate independent agency for several reasons:

(1) It is the proponent agency for BCT and AIT Infantry.
(2) It has a staff who are expert in the subject areas of BCT and AIT Infantry.
(3) It is the monitor of BCT and AIT Infantry training.
(4) It participated in the Fort Ord EVATP to the extent of validating the performance tests, thus knowing in what areas comparisons could be made between the experimental and conventional programs.

A team from the Infantry School administered the tests at Fort Ord during the week of 2 June. The same team administered the tests at Fort Jackson during the following week, 7 June. The tests were prepared solely by the Infantry School, after HumRRO and the Infantry School jointly agreed upon what subjects should be tested.

Once the comparison tests were administered and the data collected, HumRRO's responsibility was to prepare a report, summarizing and evaluating the test results.

BCT PERFORMANCE COMPARISON TESTS

Results of the Performance Tests

Tables B-1 through B-7 present the comparison data between Fort Ord and Fort Jackson BCT graduates. Each table shows the percentage of soldiers at the two posts who were able to perform each test requirement, together with the percentage who were able to perform all test requirements. Each table shows whether the difference between the percentages of Fort Ord and Fort Jackson men who performed successfully all test requirements is statistically significant. Each performance requirement is indicated, as well as the number of checkpoints where these were specified or appropriate.

The soldiers at Fort Ord generally show a clear and strong superiority over their counterparts at Fort Jackson in five of the seven subjects tested. This superiority is reflected in the statistically significant differences between men at each post who were able to perform all requirements without error on most subjects. These subjects include First Aid, Land Navigation, M-16 Weapon Maintenance, and Guard (Tables B-1, B-3, B-4, and B-5). While the Chemical, Biological and Radiological (CBR) results (Table B-2) cannot be compared in terms of the percentages of men passing all requirements, the extent of percentage differences on each requirement indicates that the experimental program clearly trains men to perform each skill at a superior level proficiency.

In the subjects of Individual Tactical Training (ITT) and Drill and Ceremonies (D&C) (Tables B-6 and B-7), approximately equivalent percentage levels of performance were reached by the two samples tested. The difference between the percentages of men passing all requirements was not statistically significant, although Fort Ord had a slightly higher percentage of men passing all requirements.

In the General Subjects, First Aid, CBR, and Land Navigation, the traditional paradigm of lecture-demonstration-practical application was inadequate in training soldiers to perform skills, when contrasted to performance-oriented instruction. One of the inadequacies of this paradigm was that lectures and demonstrations absorbed the majority of time, with a brief portion of time spent in practical application. Thus, soldiers during most of instruction are passively receiving knowledge, rather than actively engaged in the act of learning a repertoire of skills. Even in the subjects, such as M-16 Weapons Maintenance and Guard, where the stress on practical application has been strong in the conventional program, this method of instruction was inadequate in preparing men to perform skills at a high level of proficiency.

Thus, the superior performance of men trained under the experimental program is probably ascribable to the redirection in method toward active practice and review, and to the establishment of an integrated system of performance tests, which verify that the skills are mastered and maintained throughout BCT.

Selection of the Test Samples

To prevent any regional differences influencing the comparison study, the test samples at Forts Ord and Jackson consisted of men sent from the Midwest. Not only regional differences but also AFQT differences were controlled by using men from the same geographic area. Figure B-1 shows the distribution of men in Mental Categories I through IV at both Fort Ord and Fort Jackson. In distribution by mental category, the samples were almost identical.

BCT Performance Test Results and the Effects of Mental Aptitude

Because the mental category distributions at the two posts were essentially equivalent, the performance differences cannot be accounted for by the fact that a larger proportion of men of higher aptitude were tested at Fort Ord. This section examines whether performance differences of men in each mental category were consistent with overall post differences. If they were not consistent, then there would be evidence that men in the higher mental categories contributed unduly by their inordinate number of successes to overall post differences. In such a case, the overall differences between posts would have resulted because the experimental training program was more effective with men in the higher mental categories than those in the lower ones.

Tables B8 through B-13 summarize the percentage of men in each mental category group who made no errors in all subjects.[1] The conclusion can be easily reached that

[1] The manner in which the CBR test data were collected did not permit such a table to be prepared for that subject.

Distributions of Mental Category for the BCT Midwest Fill at Fort Ord and Fort Jackson

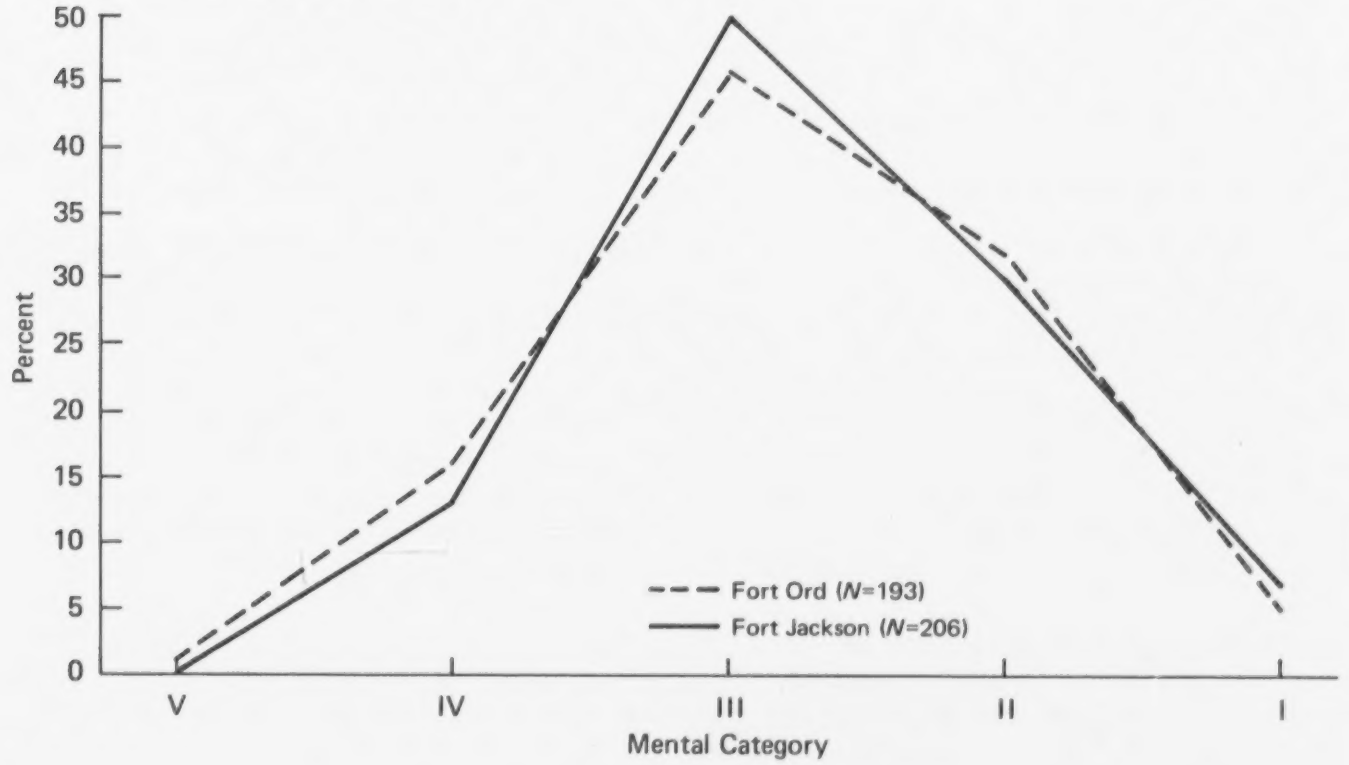


Figure B-1

there was no bias arising from an undue contribution by Category I and II men toward the total percentage of successful performance in the general Fort Ord results (Tables B-1 through B-7). The general performance differences between the two posts were apparent in the performance differences of Fort Ord and Fort Jackson men in each mental category: Where there were strong differences between the performances of Fort Ord vs. Fort Jackson men, those differences remained strong throughout mental category levels. Where slight general differences occurred, differences throughout mental category levels remained slight.

Moreover, the Fort Ord results indicate that the performance differences among men of each mental category were generally attenuated by such a performance-oriented program. Men in the higher mental categories I and II did not perform in a highly superior fashion to men in the lower categories. In a few cases, men in lower categories performed more ably than men in the higher categories.

The data do not support the conclusion that overall BCT performance differences can be ascribed to disproportionate numbers of men tested in higher mental categories at Fort Ord and an inordinate number of successes scored by Fort Ord men in the higher mental categories.

Test Administration

There is some disparity in the number of men tested at the two posts, but it does not hamper comparison. Although fewer men were tested at Fort Ord than at Fort Jackson, the sample size at Fort Ord was sufficient to compare to the sample tested at Fort Jackson.

While there were differences in the way the tests were administered at the two posts, it is our estimate that any systematic bias was controlled by (a) having an

independent agency do the testing, (b) using men from the same geographic area as the test sample at both posts, and (c) having virtually identical test populations in regard to AFQT distribution.

AIT PERFORMANCE COMPARISON TESTS

Results of the Performance Tests

While the initial plan of testing called for a comparison to be made only in August between the graduates of the experimental AIT program at Fort Ord and the conventional program at Fort Jackson, there was sufficient time during the June testing to allow for an additional comparison.

Tables B-14 through B-21 present the performances of the Fort Ord soldiers compared with the performances of the Fort Jackson soldiers on a variety of skills taught during AIT. Each table shows the percentage of soldiers at both posts who were able to perform each test requirement, together with the percentage who were able to perform all test requirements. Each table also shows whether the difference between the percentages of Fort Ord and Fort Jackson men who performed all test requirements successfully is statistically significant. Each performance requirement is indicated, as well as the number of checkpoints included within each, where these were specified or appropriate.

To put these results in context, it must be noted that the Fort Ord AIT program included training for the 11B MOS and either the 11C or Mechanized Training within the 8-week period. The successful graduates received the 11B MOS at the end of the fourth week of the AIT program. After a Field Training Exercise (FTX), the men were assigned either to Mechanized Infantry or Mortar training. The reduction of 11B training to four weeks was made possible through a revision in the amount of time spent in lecture presentation and the elimination of subject material, some of which overlapped with BCT. Further, instruction in all subjects, whether the amount of time was reduced or not, was reoriented to allow for the implementation of the six principles of the EVATP.

From this perspective, the results indicate that in general the experimental AIT program produced soldiers with a higher degree of total instructional time. Using the standard of success in passing all requirements as an indicator of differences between performances by Fort Ord and Fort Jackson men, the soldiers trained at Fort Ord performed at a higher level of skill attainment that was statistically significant in all subjects except .45 Caliber Pistol.

In the weapons use and maintenance subjects that dominate AIT, where the conventional program includes substantial time for practical application, the soldiers at Fort Ord showed a considerably higher level of proficiency over their counterparts at Fort Jackson. The only subjects where there were minimal overall differences were in .45 Caliber Pistol and the M-203 Grenade Launcher (Tables B-14 and B-15).

In the skills associated with the M-79 Grenade Launcher, M-72 LAW, M-60 Machinegun, the Starlight Scope (NVD), and Landmine Warfare (Tables B-15 through B-19), the results demonstrate that the Fort Ord soldier generally reached significantly higher levels of proficiency than his counterpart at Fort Jackson. The reallocation of time in the EVATP to additional practice, performance check under a mastery standard, and remedial training are probably the factors contributing to this higher level of attainment.

In the performance of skills that have a stronger cognitive element, such as those tested in Communications and Land Navigation (Tables B-20 and B-21), the soldier trained under performance-oriented instruction and a mastery requirement generally maintained his higher proficiency level.

The Land Navigation results (Table B-21) indicate that the map-reading skills taught under the BCT EVATP are well retained. The hours devoted to formal Land Navigation training in AIT were eliminated, with all training in this subject taking place in the fourth week of BCT. The time between instruction and testing was approximately nine weeks. The data show a high level of retention.

Selection of the AIT Test Samples

The AIT test samples at both training installations were not controlled, as were the BCT samples, with regard to mental category distribution and geographic area. The men tested were those who, as a matter of course, were assigned to either Fort Ord or Fort Jackson for training. Figure B-2 shows the distribution of Mental Categories I-IV for the test samples at both training centers. The test samples were not equivalent: At Fort Ord, more Category I and II men were tested, while Category III and IV men constituted a greater proportion of the sample at Fort Jackson.

Distributions of Mental Category for the AIT Graduates Tested at Fort Ord and Fort Jackson

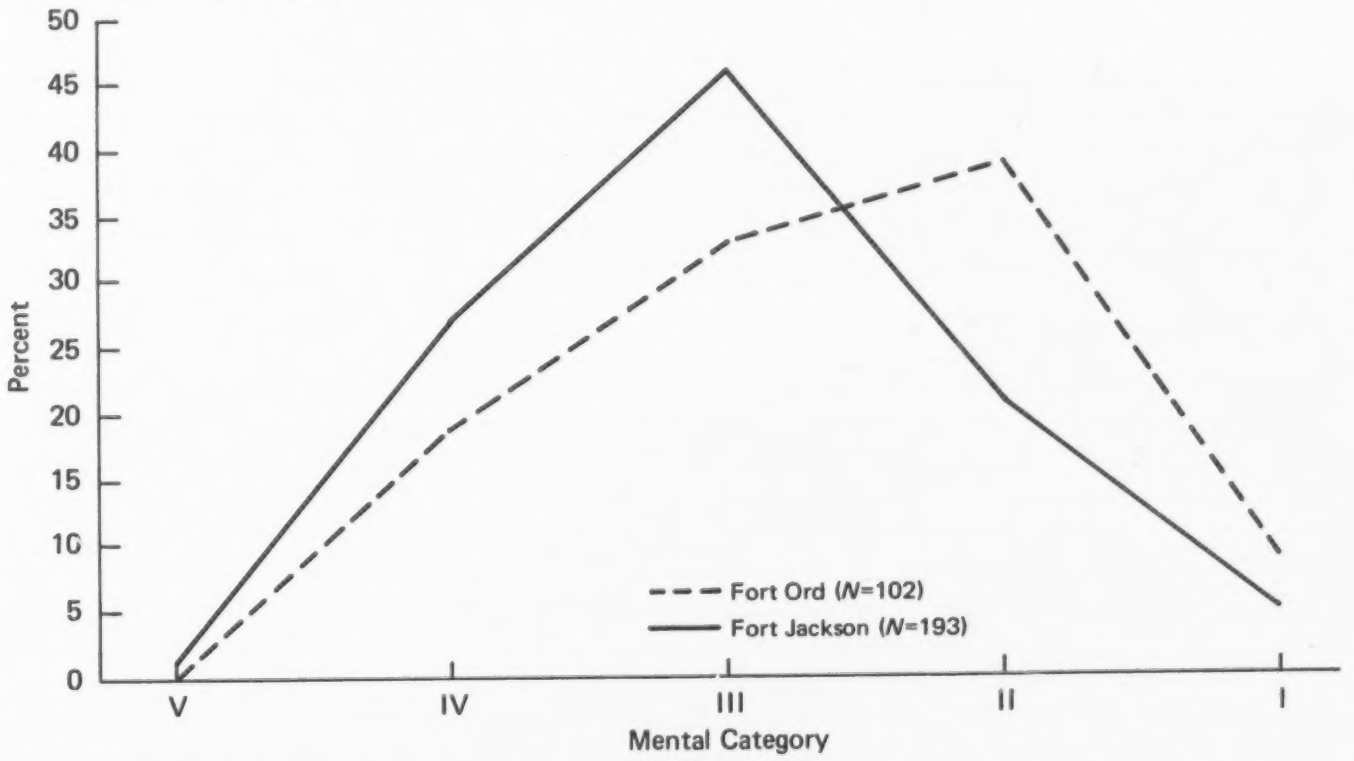


Figure B-2

Effect of Mental Aptitude on AIT Performance Test Results

Since men of mental category levels were distributed disproportionately, the effect of that factor has to be considered in the discussion of the data. The results have been analyzed to estimate the effect of mental category on performance.

Tables B-22 through B-29 show the percentage of men by mental category level who made no errors on all requirements at both Forts and whether the differences were statistically significant.

The data summarized in these tables generally substantiate the overall performance differences found by post. Where there were strong differences between posts, these differences remained strong when performances of the men at both posts in each mental category were compared. Category I and II men at Fort Ord performed at a level superior to their Fort Jackson counterparts in five of the eight subjects tested. The same held true for Category III and IV men at Fort Ord. Their performance was superior to men in the same categories at Fort Jackson in five of the eight subjects tested. The performances of men in each mental category were consistent with overall performances by post.

Table B-30 compares the performance at Fort Ord men in the three mental category groups on the AIT tests. It also shows whether the performance differences among the men in each mental category were statistically significant.

The data support the proposition that at Fort Ord, Category I and II men generally did not perform at a level significantly higher than the one attained by men in the lower categories. Only in two subjects did mental aptitude have an effect on the Fort Ord performance test results—Land Navigation and the M-72 LAW. Because Land Navigation is a subject that has a large cognitive skill component, the effect of mental aptitude on performance is not surprising. Why mental aptitude affects performance on the M-72 LAW is not readily understandable; we cannot account for the effect with the present data.

Although more Category I and II men were proportionally represented at Fort Ord than at Fort Jackson, the overall performance superiority at Fort Ord cannot be attributed to their influence. When the performances of men in each mental category group were compared by post, they generally were in line with overall post differences. At Fort Ord, Category I and II men did not generally perform at a level significantly superior to the one attained by Category III and IV men.

Test Administration

As in the case of the BCT testing, administrative difficulties prohibited the testing of the same number of men at Fort Ord and at Fort Jackson. The number of men tested at Fort Ord, although fewer, was of sufficient size for comparison with the greater number tested at Fort Jackson.

RESULTS OF THE 81-MM MORTAR COMPARISON TESTS

The graduates of the conventional 11C training at Fort Jackson were compared with the graduates of the EVATP 11C training at Fort Ord on three tasks: mounting the mortar, making a large deflection and elevation change, and laying the mortar in parallel. Training in mortar gunnery skills at Fort Ord took place under a modified peer instruction system within a three-week period. Training in the techniques of Forward Observation and Fire Direction Control was given by NCOs, using the seminar method, with men in the third week acting as assistant instructors.

Table B-31 presents the results of the comparison. This comparison was not made of individuals, but of teams. Two-man crews were tested in mounting the mortar, three-man crews in making a large deflection and elevation change, and in laying the mortar in parallel. These data present an inconclusive picture. While a greater percentage of the Fort Jackson crews were able to mount the mortar correctly within the time specified, a greater percentage of the Fort Ord crews were able to make the deflection and elevation changes and lay the mortar in parallel correctly within the time limits. Also, equivalent percentages of the two sets of crews were able to perform all three tasks successfully.

The comparison test was made at a time when the Fort Ord 11C training had been newly instituted. There may have been insufficient time for Fort Ord to make its conversion to this program of instruction fully operational. The only conclusion that the data permit is that the EVATP and conventional programs trained men to equivalent levels of performance.

BCT SUMMARY AND CONCLUSIONS

In the general subjects, First Aid, CBR, and Land Navigation, the reorientation of instruction toward performance objectives and mastery of skills produced a soldier with a superior level of skill attainment, when compared with his conventionally trained counterpart.

In the subjects Guard and M-16 Weapon Maintenance, where the contrast in amount of practical work between the conventional and experimental programs was less marked, the difference in performances still remained significantly in favor of the men trained under the experimental program. The additional time devoted to practical work and review under a system of performance checks yielded a higher level of skill attainment.

Only in subjects ITT and Drill and Ceremonies were there no significant overall performance differences.

There were no disproportionate contributions by Category I and II men toward the total percentage of successful performances in the general Fort Ord results.

The differences in performances of Fort Ord vs. Fort Jackson men in each mental category were in the direction of the general performance differences.

The Fort Ord results indicate that the performance differences among men at each mental category were lessened by the performance orientation of the EVATP. The trend was toward reduction of performance differences among mental categories.

AIT SUMMARY AND CONCLUSIONS

In general, the results indicate that the experimental AIT program produced soldiers with a higher degree of skill attainment in the subjects tested within a shorter period of instructional time.

Even in the weapons subjects, where conventionally there was a substantial amount of practical work, the soldiers trained at Fort Ord showed a considerably higher level of proficiency. The only exceptions were performances on the .45 Caliber Pistol tests and the M-203 Grenade Launcher tests, where the levels of performance were roughly equivalent.

In the tests of Communications and Land Navigation, where a stronger cognitive component was tested, the soldiers trained under performance-oriented instruction generally maintained their higher level of proficiency. The Land Navigation test results indicate that these skills were retained at a considerable level over a nine-week period.

Overall, the EVATP trains men of all mental category levels to a higher level of proficiency in most of the subject skills. The EVATP tends to lessen, in addition, the degree of achievement differences among men of all category levels.

Table B-1

EVATP Performance Evaluation, BCT: First Aid[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=173)	Fort Jackson (N=222)	
Each Requirement				
Applying Tourniquet	4	68	5	
Treating Sucking Chest Wound	4	84	7	
Treating a Fracture	4	80	4	
All Requirements	--	47	0.5	<.001

[a]Dates tested: Fort Ord, 2-4 June 1971; Fort Jackson, 9 June 1971.

[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-2

EVATP Performance Evaluation, BCT: CBR[a]

Requirements	No. of Checkpoints	Fort Ord		Fort Jackson		p[b]
		N Tested	% Pass	N Tested	% Pass	
Each Requirement						
Masking Drill	4	165	64	223	18	<.001
Decontaminating an Unknown Liquid Agent	3	109	88	223	61	<.001
Nuclear Protection, No Warning	3	67	85	223	50	<.001
Nerve Gas Treatment	4	63	86	223	32	<.001
All Requirements	--	--[c]	--[c]	223	4	--

[a]Dates tested: Fort Ord, 2-4 June 1971; Fort Jackson, 9 June 1971.

[b]Significance of differences between Posts.

[c]Because of administrative difficulties during testing, it was not possible to develop this information.

Table B-3

EVATP Performance Evaluation, BCT: Land Navigation[a]

Requirements	Percent Passing		p[b]
	Fort Ord (N=153)	Fort Jackson (N=223)	
Each Requirement			
Identification of Landmark	93	86	
Determine 6-digit Coordinate	88	69	
Determine Grid Azimuth	92	73	
Determine Straight-Line Distance A→B	69	21	
Determine Hill Elevation	92	28	
All Requirements	41	7	<.001

[a]Dates tested: Fort Ord, 2-4 June 1971; Fort Jackson, 9 June 1971.
[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-4

EVATP Performance Evaluation, BCT: M-16 Weapon Maintenance[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=154)	Fort Jackson (N=223)	
Each Requirement				
Immediate Action	4	47	51	
Cleaning Weapon	4	70	32	
Disassembly	4	98	96	
Assembly	4	98	96	
All Requirements	–	38	18	<.001

[a]Dates tested: Fort Ord, 2-4 June 1971; Fort Jackson, 9 June 1971.
[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-5

EVATP Performance Evaluation, BCT: Guard[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=154)	Fort Jackson (N=222)	
Each Requirement				
Guard Approached and Questioned by OD	4	92	78	
Guard Challenges Man	5	99	91	
Guard Deals With Violation of Special Orders	3	99	93	
All Requirements	--	90	78	<.003

[a]Dates tested: Fort Ord, 2-4 June 1971; Fort Jackson, 9 June 1971.

[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-6

EVATP Performance Evaluation, BCT: Individual Tactical Training (ITT)[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=80)	Fort Jackson (N=222)	
Each Requirement				
Prone Night Fire Position	3	89	82	
Low Crawl	3	92	70	
Barbed Wire Obstacle	3	94	91	
Overhead Flare	2	76	83	
Fire and Movement	8	69	83	
All Requirements	--	46	39	NS

[a]Dates tested: Fort Ord, 2-4 June 1971; Fort Jackson, 9 June 1971.

[b]Differences between Posts are not statistically significant.

Table B-7

EVATP Performance Evaluation, BCT: Drill and Ceremonies[a]

Requirements	Percent Passing		p[b]
	Fort Ord (N=85)	Fort Jackson (N=223)	
Each Requirement			
Fall In	67	48	
About Face	75	75	
Right Step; Halt	72	93	
Two Steps Backwards; March	91	89	
Left Face	86	91	
Forward March	91	92	
Rear March	88	91	
Half Step March	87	78	
Squad Halt	75	95	
Right Face	84	90	
Present Arms, Order Arms	93	87	
Inspection Arms, Port Arms	79	83	
Stand at Ease	71	80	
All Requirements	14	11	NS

[a]Dates tested: Fort Ord, 2-4 June 1971; Fort Jackson, 9 June 1971.
[b]Differences between Posts are not statistically significant.

Table B-8

EVATP Performance Evaluation by Mental Category, BCT: First Aid

Mental Category	Pass All Requirements			
	Fort Ord		Fort Jackson	
	N Tested	% Pass	N Tested	% Pass
I and II	55	60	76	0
III	72	41	102	1
IV	27	48	25	0

Table B-9

EVATP Performance Evaluation by Mental Category, BCT: Land Navigation

Mental Category	Pass All Requirements			
	Fort Ord		Fort Jackson	
	N Tested	% Pass	*N* Tested	% Pass
I and II	55	65	76	14
III	70	53	102	3
IV	27	41	25	4

Table B-10

EVATP Performance Evaluation by Mental Category, BCT: Guard

Mental Category	Pass All Requirements			
	Fort Ord		Fort Jackson	
	N Tested	% Pass	*N* Tested	% Pass
I and II	55	96	76	63
III	72	94	101	71
IV	27	74	26	73

Table B-11

EVATP Performance Evaluation by Mental Category, BCT: M-16 Weapon Maintenance

Mental Category	Pass All Requirements			
	Fort Ord		Fort Jackson	
	N Tested	% Pass	*N* Tested	% Pass
I and II	59	36	76	26
III	68	37	102	17
IV	26	19	25	8

Table B-12

EVATP Performance Evaluation by Mental Category, BCT: Individual Tactical Training (ITT)

Mental Category	Pass All Requirements			
	Fort Ord		Fort Jackson	
	N Tested	% Pass	*N* Tested	% Pass
I and II	39	49	76	34
III	45	60	101	39
IV	12	17	25	40

Table B-13

EVATP Performance Evaluation by Mental Category, BCT: Drill and Ceremonies (D&C)

Mental Category	Pass All Requirements			
	Fort Ord		Fort Jackson	
	N Tested	% Pass	*N* Tested	% Pass
I and II	27	15	76	14
III	40	20	102	12
IV	16	6	25	0

Table B-14

EVATP Performance Evaluation, AIT: .45 Caliber Pistol[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (*N*=97)	Fort Jackson (*N*=184)	
Each Requirement				
Disassembly	4	96	91	
Safety Positions	3	87	91	
All Requirements	--	87	85	NS

[a]Dates tested: Fort Ord, 4 June 1971; Fort Jackson, 10 June 1971.

[b]Differences are not statistically significant between Posts.

Table B-15

EVATP Performance Evaluation, AIT: M-79 and M-203 Grenade Launchers[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=95)	Fort Jackson (N=127)	
Each Requirement				
Disassemble Grenade Launcher, M-79	5	99	63	
Disassemble Grenade Launcher, M-203	3	99	96	
All Requirements	--	98	61	<.001

[a]Dates tested: Fort Ord, 4 June 1971; Fort Jackson, 10 June 1971.

[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-16

EVATP Performance Evaluation, AIT: M-72 LAW[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=97	Fort Jackson (N=178)	
Each Requirement				
Putting into Operation	6	84	1	
Taking out of Operation	3	98	72	
All Requirements	--	82	1	<.001

[a]Dates tested: Fort Ord, 4 June 1971; Fort Jackson, 10 June 1971.

[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-17

EVATP Performance Evaluation, AIT: M-60 Machine Gun[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=50)	Fort Jackson (N=143)	
Each Requirement				
Disassembly	5	76	33	
Assembly	4	70	35	
Misfire Procedure	8	70	11	
All Requirements	--	34	10	<.001

[a]Dates tested: Fort Ord, 4 June 1971; Fort Jackson, 10 June 1971.

[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-18

EVATP Performance Evaluation, AIT: Night Vision Device (NVD)[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=96)	Fort Jackson (N=142)	
Each Requirement				
Mounting the Starlight Scope	6	68	4	
Maintenance of the Starlight Scope	3	16	0	
All Requirements	--	9	0	<.001

[a]Dates tested: Fort Ord, 4 June 1971; Fort Jackson, 10 June 1971.

[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-19

EVATP Performance Evaluation, AIT: Landmine Warfare[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=95)	Fort Jackson (N=151)	
Each Requirement				
M-14 Mine, Arming and Concealing	6	51	26	
Claymore Mine, Arming of Mine and testing of firing device	7	51	32	
M-49 Al Trip Flare, Arming and concealing	4	81	46	
All Requirements	--	44	7	<.001

[a]Dates tested: Fort Ord, 4 June 1971; Fort Jackson, 10 June 1971.

[b]Tests of Statistical significance for differences between Posts are reported only for "All Requirements."

Table B-20

EVATP Performance Evaluation, AIT: Communications[a]

Requirements	No. of Checkpoints	Percent Passing		p[b]
		Fort Ord (N=97)	Fort Jackson (N=184)	
Each Requirement				
PRC-77, Placing in Operation and Selecting Given Frequency	15	93	48	
Phonetic Alphabet	5	93	80	
Squad Radio, Placing Into Operation and Selecting Channel	8	58	55	
All Requirements	--	52	20	<.001

[a]Dates tested: Fort Ord, 4 June 1971; Fort Jackson, 10 June 1971.

[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-21

EVATP Performance Evaluation, AIT: Land Navigation[a]

Requirements	Percent Passing		p[b]
	Fort Ord (N=96)	Fort Jackson (N=183)	
Each Requirement			
Identify Man-made Landmark on Map	96	90	
Determine 6-digit Grid Coordinate on Map	97	76	
Determine a Grid Azimuth	87	88	
Determine a Straight-line Distance	86	38	
Determine Elevation of a Hill	89	49	
All Requirements	71	21	<.001

[a]Dates tested: Fort Ord, 4 June 1971; Fort Jackson, 10 June 1971.

[b]Tests of statistical significance for differences between Posts are reported only for "All Requirements."

Table B-22

EVATP Performance Evaluation by Mental Category, AIT: .45 Caliber Pistol

Mental Category[a]	Pass All Requirements			
	Fort Ord		Fort Jackson	
	N Tested	% Pass	N Tested	% Pass
I and II	47	87	48	92
III	31	90	82	85
IV	17	76	50	80

[a]Differences among men in all mental categories are not statistically significant.

Table B-23

EVATP Performance Evaluation by Mental Category, AIT: M-79 and M-203 Grenade Launchers

Mental Category	Passing All Requirements			
	Fort Ord		Fort Jackson[a]	
	N Tested	% Pass	*N* Tested	% Pass
I and II	48	100	38	79
III	31	97	57	63
IV	17	94	29	79

[a]Differences between Category I and II and Category III men are statistically significant.

Table B-24

EVATP Performance Evaluation by Mental Category, AIT: LAW M-72

Mental Category	Passing All Requirements			
	Fort Ord		Fort Jackson[a]	
	N Tested	% Pass	*N* Tested	% Pass
I and II	45	93	48	2
III	28	75	81	1
IV	17	71	51	0

[a]Differences among all three mental category levels are significant.

Table B-25

EVATP Performance Evaluation by Mental Category, AIT: Night Vision Device (NVD)

Mental Category	Passing All Requirements			
	Fort Ord		Fort Jackson[a]	
	N Tested	% Pass	*N* Tested	% Pass
I and II	48	11	32	0
III	31	6	64	0
IV	17	18	47	0

[a]Differences among Category III and IV are statistically significant.

Table B-26

EVATP Performance Evaluation by Mental Category, AIT: M-60 Machinegun

Mental Category	Passing All Requirements			
	Fort Ord		Fort Jackson[a]	
	N Tested	% Pass	*N* Tested	% Pass
I and II	20	45	30	10
III	20	25	61	11
IV	8	25	37	11

[a]Differences among Category I and II men are statistically significant.

Table B-27

EVATP Performance Evaluation by Mental Category, AIT: Landmine Warfare

Mental Category	Passing All Requirements			
	Fort Ord		Fort Jackson[a]	
	N Tested	% Pass	*N* Tested	% Pass
I and II	46	43	35	3
III	31	23	74	11
IV	17	47	40	3

[a]Differences among Category I and II men and Category IV men are statistically significant.

Table B-28

EVATP Performance Evaluation by Mental Category, AIT: Communications

Mental Category	Passing All Requirements			
	Fort Ord		Fort Jackson[a]	
	N Tested	% Pass	*N* Tested	% Pass
I and II	48	52	48	35
III	31	55	86	18
IV	17	47	49	12

[a]Differences among men in all mental categories are significant.

Table B-29

EVATP Performance Evaluation by Mental Category, AIT: Land Navigation

Mental Category	Passing All Requirements			
	Fort Ord		Fort Jackson[a]	
	N Tested	% Pass	*N* Tested	% Pass
I and II	48	77	48	42
III	31	71	81	20
IV	16	63	51	8

[a]Differences among men in all mental categories are significant.

Table B-30

Comparison Among Fort Ord Men in Three Mental Category Groups on AIT Performance Tests

Requirements	Percent Passing		
	I and II	III	IV
.45 Caliber Pistol	87	90	76
M-79 and M-203 GL	100	97	94
M-70 LAW	93	75	71[a]
NVD	11	6	18
M-60 MG	45	25	25
LMW	43	23	47
Commd	52	55	47
LN	77	71	63

[a]These differences are statistically significant.

Table B-31

EVATP Performance Evaluation, AIT: 81-mm Mortar[a]

Requirements	No. of Checkpoints	Percent Passing		*p*[b]
		Fort Ord (*N*=107)	Fort Jackson (*N*=89)	
Each Requirement				
Mount Mortar	7	46	67	
Large Deflection and Elevation	2	65	58	
Lay Mortar Parallel	4	72	46	
All Requirements	--	26	24	NS

[a]Dates tested: Fort Ord, 2 June 1971; Fort Jackson, 11 June 1971.
[b]Differences are not statistically significant between Posts.

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2 CG EUSA ATTN G-3 APO 96301 SAN FRAN
1 CLIN PSYCHOL SERV DEPT OF NEUROPSYCHIAT WALTER REED GEN HOSP
1 DIR HEL APG MD
1 CG USA CDC EXPERIMENTATION COMD FT ORD
2 ENGNR PSYCHOL LAB PIONEERING RES DIV ARMY NATICK LABS NATICK MASS
2 TECH LIB ARMY NATICK LABS NATICK MASS
3 CO DEF DEVEL ENGNR LAB EDGEWOOD ARSENAL ATTN LIBN
2 INST OF LAND CBT ATTN TECH LIB FT BELVOIR VA
1 CO USA CDC CBR AGCY ALA
1 REDSTONE SCIENTIFIC INFO CTR US ARMY MSL COMD ATTN CHF DOC SEC ALA
1 CO FT HUACHUCA SPT COMD USA ATTN TECH REF LIB
2 CG US ARMY CDC EXPERIMENTATION COMD FT ORD
1 SIXTH USA LIB DEPOT BLDG M 13 14 PRES OF SAN FRAN
1 CHF DEPT OF CLIN & SOC PSYCH WALTER REED ARMY INST OF RES WASH D C
1 PLNS OFCR PSYCH HDQTRES USACDCEC FT ORD
5 CG FT ORD ATTN G3 TNG DIV
1 CO DUGWAY PG UTAH ATTN TECH LIB
1 DIR WALTER REED ARMY INST OF RES WALTER REED ARMY MED CTR
2 DIR WRAIR WALTER REED ARMY MED CTR ATTN NEUROPSYCHIAT DIV
1 CO HQ ARMY ENLISTED EVAL CTR FT BENJ HARRISON
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1 CO USA MOBILITY EQUIP R&D CTR ATTN TECH DOC CTR FT. BELVOIR
1 CO FRANKFORD ARSNL ATTN SMUFA-N6400/202-4 PA
1 CG 2ND RGN ARADCOM RICHARDS-GEBAUR AFB MO
3 6TH RGN USARADCOM FT BAKER
1 4TH ARMY MSL COMD AIR TRANSPORTABLE SAN FRAN
1 PERS SUBSYS DIV CREW SUBSYS DRCT AERO SYS DIV WRIGHT-PAT.
1 DIR ARMY BD FOR AVN ACCIDENT RSCH FTRUCKER
2 CO PICATINNY ARSNL DOVER N J ATTN SUMPA VCI
1 LIB DEF SUPPLY AGCY CAMERON STA VA
2 CO USA CDC AG AGCY FT BENJ HARRISON IND
1 REF M MS IS NASA ALA
1 CO USA CBT DEVEL COMD TRANS AGCY FT EUSTIS
1 CO ARMY CDC INF AGY FT BENNING
1 CO ARMY CDC ARMOR AGY FT KNOX
USA CDC SPEC WARFARE AGENCY FT BRAGG
CO US ARMY CDC AVN AGCY FT RUCKER
1 DIR OF INTERN TNG USA LOG MGT CTR FT LEE
3 CO USA CDC CBT SUPPORT GP FT BELVOIR
3 CO USA TNG CTR (FA) ATTN AKPSITC-TT FT SILL
1 CG USA TNG CTR & FT LEONARD WOOD ATTN ACOFS G3
1 CG USA INF CTR ATTN AJIGT-T FT BENNING
1 CG USA TNG CTR INF ATTN ACOFS G3 FT DIX
1 CG USA TNG CTR ATTN ACOFS G3 FT JACKSON
1 CG USA TNG CTR INF ATTN ACOFS G3 FT LEWIS
1 CG USA TNG CTR INF & FT ORD ATTN ACOFS G3
61 CG USA TNG CTR INF ATTN ACOFS G3 FT POLK
5 CO USA MED TNG CTR ATTN DIR OF TNG FT SAM HOUSTON
20 CG USA AD CTR ATTN G3 FT BLISS
1 CG USA TNG CTR INF ATTN ACOFS G3 FT CAMPBELL
3 LIB ARMY WAR COLL CARLISLE BKS
1 CO USA INTELL SCH ATTN AHBH-S-AO FT HUACHUCA
1 COMDT COMD + GEN STAFF CO FT LEAVENWORTH ATTN ARCHIVES
1 DIR OF MILIT PSYCHOL + LDRSHP US MILIT ACAD WEST POINT
1 US MILIT ACAD WEST POINT ATTN LIB
1 COMDT ARMY AVN SCH ATTN DIR OF INSTR FT RUCKER
2 COMDT ARMY SECUR AGY TNG CTR + SCH FT DEVENS ATTN LIB
1 COMDT INDSTR COLL OF THE ARMED FORCES FT MCNAIR
2 COMDT NATL WAR COLL FT LESLEY J MCNAIR ATTN CLASSF RECORDS BR LIB
1 STIMSON LIB MED FLD SERV SCH BROOKE ARMY MED CTR FT SAM HOUSTON
10 COMDT THE ARMOR SCH ATTN DOI FT KNOX
1 COMDT ARMY ARMOR SCH FT KNOX ATTN WEAPONS DEPT
1 LIB USA ARMOR SCH FT KNOX
1 COMDT USA CHAPLAIN SCH ATTN DOI FT HAMILTON
1 COMDT ARMY CHEM CORPS SCH FT MCCLELLAN ATTN EDUC ADV
1 COMDT USA FIN SCH ATTN CHF DOC DEV LIT PLN DIV ODOI IND
1 USA FINANCE SCH FT BENJ HARRISON ATTN EDUC ADV
4 COMDT ADJ GEN SCH FT BENJ HARRISON ATTN EDUC ADV
1 COMDT USAIS ATTN EDUC ADV FT BENNING
1 COMDT USAIS ATTN AJIIS-D-EPRD FT BENNING
1 HQ US ARMY ADJ GEN SCH FT BENJ HARRISON ATT COMDT
1 LIB ARMY QM SCH FT LEE
1 COMDT USA QM SCH FT LEE ATTN EDUC ADV
1 COMDT ARMY TRANS SCH FT EUSTIS ATTN EDUC ADV

1 CO USA SEC AGY TNG CTR & SCH ATTN IATEV RSCH ADV FT DEVENS
1 COMDT USA MIL POLICE SCH ATTN PLNS &PROG ODOI FT GORDON
2 COMDT US ARMY SOUTHEASTERN SIG SCH ATTN EDUC ADV FT GORDON
1 COMDT USA AD SCH ATTN DOI FT BLISS
1 CO USA ORD CTR & SCH OFC OF OPS ATTN AHBN-O APG MD
5 ASST COMDT ARMY AIR DEF SCH FT BLISS ATTN CLASSF TECH LIB
3 CG USA FLD ARTY CTR & FT SILL ATTN AVN OFCR
1 COMDT DEF INTELL SCH ATTN SIGAS DEPT
1 COMDT ARMED FORCES STAFF COLL NORFOLK
1 COMDT USA SIG CTR & SCH ATTN DOI FT MONMOUTH
1 COMDT JUDGE ADVOCATE GENERALS SCH U OF VA
1 DPTY COMDT USA AVN SCH ELEMENT GA
1 DPTY ASST COMDT USA AVN SCH ELEMENT GA
1 USA AVN SCH ELEMENT OFC OF DIR OF INSTR ATTN EDUC ADV GA
1 EDUC CONSLT ARMY MILIT POLICE SCH FT GORDON
6 COMDT USA ENGR SCH ATTN EDUC ADV AHBBES-EA FT BELVOIR
2 COMDT USA SCH EUROPE ATTN EDUC ADV APO 09172 NY
1 OFC OF DOCTRINE DEV LIT & PLNS USA ARMOR SCH ATTN AHBAAS-DM
1 COMDT ARMY AVN SCH FT RUCKER ATTN EDUC ADV
5 CG USA PRIM HELICOPTER CTR/SCH & FT WOLTERS ATTN ATSPH-DOT
1 DIR OF INSTR US MIL ACAD WEST POINT NY
1 DIR OF MILIT INSTR US MILIT ACAD WEST POINT
1 USA INST FOR MIL ASSIST ATTN LIB BLDG 1ST2808 FT BRAGG
4 USA INST FOR MIL ASSIST ATTN COUNTERINSURGENCY DEPT FT BRAGG
1 COMDT DEF MGT SCH FT BELVOIR
2 COMDT USA MSL & MUN CTR & SCH ATTN CHF OFC OF OPS REDSTONE ARSNL
2 COMDT US WAC SCH US WAC CTR ATTN AJMCT FT MCCLELLAN
2 HQ ABERDEEN PG ATTN TECH LIB
1 CO USA INTELL CTR & SCH ATTN DIR OF ACADEMIC OPS FT HUACHUCA
1 CO USA INTELL CTR & SCH ATTN DIR OF DOC & LIT FT HUACHUCA
1 COMDT USA C&GSC OFC OF CHF OF RESIDENT INSTR FT LEAVENWORTH
1 COMDT USA CA SCH ATTN OFC OF DOCTRINE DEVEL LIT & PLNS FT BRAGG
1 COMDT USA CA SCH ATTN DOI FT BRAGG
1 COMDT USA CA SCH ATTN EDUC ADV FT BRAGG
1 COMDT USA CA SCH ATTN LIB FT BRAGG
1 COMDT USA SCH & TNG CTR ATTN ACOFS G3 TNG DIV FT MCCLELLAN
1 COMDT USA SCH & TNG CTR ATTN ACOFS G3 PLNS & OPS DIV FT MCCLELLAN
10 COMDT USA INST FOR MIL ASSIST ATTN DOI FT BRAGG
1 LIBN USAIS FT BENNING
8 COMDT USA FLD ARTY SCH ATTN DOI FT SILL
1 COMDT USA ARTY SCH ATTN EDUC SERVICES DIV FT SILL
1 COMDT USA ARTY SCH ATTN EDUC ADV FT SILL
1 COMDT USA TRANS SCH ATTN DIR OF DOC & LIT FT EUSTIS
1 COMDT USA TRANS SCH ATTN LIB FT EUSTIS
1 USA INST FOR MIL ASST ATTN EDUC ADV FT BRAGG
1 COMDT USA C&GSC ATTN ATSCS-DJ (SPWAR)
1 COMDT ARMY QM SCH OFC DIR OF NONRESID ACTVY ATTN TNG MEDIA DIV VA
1 COMDT USA ARTY SCH ATTN LIB FT SILL
1 CG USA SCH & TNG CTR ATTN ACOFS G3 FT GORDON
1 DIR OF GRAD STUD & RSCH ATTN BEHAV SCI REP USAC&GSC
1 COMDT USA AD SCH ATTN AKBAAS-DL-EA FT BLISS
1 COMDT USA AD SCH HIGH ALTITUDE MSL DEPT FT BLISS
2 DIR BRGD + BN OPNS DEPT USAIS FT BENNING
1 LEADERSHIP COM CO OPS DEPT US ARMY INF SCH FT BENNING
1 DIR COMM ELEC USAIS FT BENNING
1 DIR ABN-AIR MOBILITY DEPT USAIS FT BENNING
2 DIR COMPANY TACTICS DEPT USAIS FT BENNING
1 CG USA SIG CTR & SCH ATTN ATSSC-DP-COB FT MONMOUTH
1 CG USA SIG CTR & SCH ATTN ATSSC-EA FT MONMOUTH
1 SECY OF ARMY, PENTAGON
1 DCS-PERS DA ATTN CHF C+S DIV
1 DIR OF PERS STUDIES & RSCH ODCSPER DA WASH DC
1 CO FOREIGN SCI + TECH CTR MUN BLDG
2 ACSFOR DA ATTN CHF TNG DIV WASH DC
1 DIR OF CBR OPS OACS FORCE DEVEL ATTN FOR CM PP
1 CG USA MAT COMD ATTN AMCRD-TE
1 CHF OF ENGNRS DA ATTN ENGTE-T
1 HQ ARMY MAT COMD R+D DRCTE ATTN AMCRD-RC
1 CHF OF PERS OPNS PERS DRCTE DA ATTN OPSC
1 CLIN PSYCHOL CONSLT OFC OF CHF PSYCHIAT & NEUROL CONSLT
2 CG ARMY MED R+D COMD ATTN BEHAV SCI RES BR
1 US ARMY BEHAVIOR & SYS RSCH LAB ATTNCRD-AR ARL VA
1 OPO PERS MGT DEV OFC ATTN MOS SEC (NEW EQUIP) OPOMO
1 PROVOST MARSHAL GEN DA
1 DIR CIVIL AFFAIRS DRCTE ODCSOPS
1 OFC RESERVE COMPON DA
2 CG USA SEC AGCY ARL HALL STA ATTN AC OF S GI VA
12 ADMIN DOC ATTN: TCA (HEALY) CAMERON STA ALEX., VA. 22314
1 CO US ARMY MED RES LAB FT KNOX
1 CG ARMY ELECT COMD FT MONMOUTH ATTN AMSEL CB
1 CHF OF R+D DA ATTN CHF TECH + INDSTR LIAISON OFC
1 CG USA ELCT COMD ATTN AMSEL-GG-DD
1 CO USA CDC MED SERV AGCY FT SAM HOUSTON
2 CG ARMY MED R+D COMD ATTN MEDDH-SR
1 USA BEHAVIOR & SYS RSCH LAB ATTN CRD-AIC ARL VA
1 COMDT USA CBT SURVEIL SCH & TNG CTR ATT ED ADV FT HUACHUCA
1 COMDT USA CBT SURVEIL SCH & TNG CTR ATTN ORG DOC & NEW EQUIP ARIZ
2 TNG & DEVEL DIV ODCSPERS
1 COMDT USA CBT SURVEIL SCH & TNG CTR ATTN 1ST CBT TNG BDE ARIZ
1 CAREER MGT BR ATTN R DETIENNE CAMERON STA ALEX VA
1 USA LIB DIV-TAGO ATTN ASDIRS
2 PRES ARMY ARMOR BD FT KNOX
1 PRES ARMY INF BD FT BENNING ATTN FE+SP DIV
2 PRES ARMY AIR DEF BD FT BLISS ATTN MST DIV

1 PRES ARMY MAINT BD FT KNOX
2 PRES ARMY AVN TEST BD FT RUCKER
2 PRES ARMY ARTY BD FT SILL
1 LIB ARMY ABN ELEC & SPEC WARFARE BD FT BRAGG
1 CG CONARC ATTN COL E M HUDAK ATIT-SA FT MONROE
15 CG CONARC ATTN ATIT-STM FT MONROE
2 CG CONARC ATTN LIB FT MONROE
1 CO ARMY CBT DEVEL COMD MILIT POLICE AGY FT GORDON
1 USA ARCTIC TEST CTR CHF INSTR & TEST METH DIV SEATTLE
1 CHF USA AD HRU FT BLISS
1 CHF USA ARMOR HRU FT KNOX
1 CHF USA AVN HRU FT RUCKER
1 CHF USA INF HRU FT BENNING
1 CHF USA TNG CTR HRU PRES OF MONTEREY
1 CG 2D ARMORED DIV FT HOOD ATTN DIV AVN OFCR
10 CG 4TH ARMORED DIV ATTN DCSOT APO NY 09326
2 CO 194TH ARMORED BDE FT KNOX
5 CO 2D ARMORED CAV REGT APO 09693 NY
1 CO 3D ARMORED CAV REGT FT LEWIS
4 CO 14TH ARMORED CAV REGT ATTN AVN OFCR APO 09146 NY
1 1ST ARMORED DIV HQ & HQ CO FT HOOD ATTN AC OF S G2
10 CO 1ST BN 63RD ARMOR 1ST INF DIV ATTN S3 FT RILEY
8 CO 1ST BN 64TH ARMOR 3RD INF DIV ATTN S3 APO NY 09031
8 CO 2ND BN 68TH ARMOR 8TH INF DIV ATTN S3 APO NY 09034
1 CO COMPANY A 3D BN 32D ARMOR 3D ARMORED DIV APO NY
1 CO 5TH BN 33D ARMOR ATTN S3 FT KNOX
1 CO 3RD BN 68TH ARMOR 8TH INF DIV ATTN S3 APO NY 09028
1 CO 3RD BN 37TH ARMOR 4TH ARMORED DIV ATTN S3 APO NY 09066
2 CALIF NG 40TH ARMORED DIV LOS ANGELES ATTN AC OF SG3
1 55TH COMD HQ DIV ARMY NG JACKSONVILLE FLA
4 CO 150TH AVN BN NJ AIR NG ELIZABETH
1 CG HQ 27TH ARMORED DIV NY AIR NG SYRACUSE
1 TEXAS NG 49TH ARMORED DIV DALLAS
3 CG ARMY ARMOR CTR FT KNOX ATTN G3 AI8KGT
1 CG 3RD INF DIV ATTN ACOFS G3 APO NY 09036
1 CG 7TH INF DIV ATT ACOFS G2 APO SAN FRAN 96207
1 CG 8TH INF DIV ATTN ACOFS G2 APO NY 09111
3 CG 4TH INF DIV (MECH) & FT CARSON ATTN ACOFS G3
1 DA HQS FT CARSON & HQS 4TH INF DIV (MECH) ATT MAJ HARRIS
3 CG 82ND ABN INF DIV ATTN ACOFS G3 FT BRAGG
1 CG XVIII ABN CORPS ATTN ACOFS G3 FT BRAGG
1 CO 197TH INF BRGD FT BENNING ATTN S3
1 CO 1ST BN (REINF) ATTN S3 FT MYER
1 CO HDQTRS 2ND BN 6TH US INF REGT ATTN S3 APO NY 09742
7 CO 3RD BN 6TH INF REGT ATTN S3 APO NY 09742
1 CO 171ST INF BDE ATTN S3 APO SEATTLE 98731
1 CO 1ST BN 39TH INF 8TH INF DIV ATTN S3 APO NY 0903
1 CO 2ND BN 15TH INF 3RD INF DIV ATTN S3 APO NY 09026
5 CG 1ST INF DIV ATTN ACOFS G3 FT RILEY
5 CO 1ST BN (MECH) 52ND INF 198TH INF BDE ATTN S3 APO SAN FRAN 96219
1 CO 4TH BN (MECH) 54TH INF ATTN S3 FT KNOX
1 CO USA PARTIC GP USA TNG DEVICE CTR FLA
2 CONSOL RES GP 7TH PSYOP GP APO 96248 SAN FRAN
2 DA OFC OF ASST CHF OF STAFF FOR COMM-ELCT ATTN CE[illegible]-6 WASH
1 CHF MED RES PROJ ARMY HOSP US MILIT ACAD WEST POINT
1 CG MILIT DIST OF WASHINGTON
2 DA USA ADV GP (ARNGUS) RALEIGH NC
1 US DOC OFCR OFC OF THE USNMR SHAPE NY NY 09055
1 USA RECRUITING COMD HAMPTON VA
1 SYS RES GP ENGNR EXPRM STA COLUMBUS O
1 DIR ARMY LIB PENTAGON
1 STRATEGIC PLANNING GP CORPS OF ENGNR ARMY MAP SERV
1 CHF OF MILIT HIST DA ATTN GEN REF BR
1 CO USA 10TH SPEC FORCES GP FT DEVENS
1 CO 24TH ARTY GP (AD) ATTN S3 RI
1 CG 31ST ARTY BDE AD ATTN S3 PA
1 CO 49TH ARTY GP AD ATTN S3 FT LAWTON
2 HQS 4TH BN 59TH ARTY REGT ATTN S3 NORFOLK
1 CO 28TH ARTY GP AD ATTN S3 SELFRIDGE AFB
1 HQ NIAGARA-BUFFALO DEF 31ST ARTY BRGD AIR DEF LOCKPORT
1 HQS 45TH ARTY BDE AD ATTN S3 ARL HTS ILL
1 CO 35TH ARTY BDE AD ATTN S3 FT MEADE MD
1 CG 101ST ABN DIV (AIRMOBILE) ATTN ACOFS G3 APO SAN FRAN 96383
1 CG 1ST CAV (AIRMOBILE) ATTN ACOFS G3 APO SAN FRAN 96383
1 US ARMY GEN EQUIP ATTN TECH LIB FT LEE
1 US ARMY TROPIC TEST CTR PO DRAWER 942 ATTN BEHAV SCIEN CZ
1 CO USAFAAC ATTN S3 FT SILL
10 CG III CORPS & FT HOOD ATTN G3 SEC FT HOOD
30 CO 1ST ARMORED DIV ATTN G3 SEC FT HOOD
30 CG 2D ARMORED DIV ATTN G3 SEC FT HOOD
25 CO 13TH SUPT BGDE ATTN S3 SEC FT HOOD
1 CG USAFAC & FT SILL ATTN AKPSIGT-TNTN
20 CO III CORPS ARTY ATTN G3 SEC FT SILL
15 CO 1ST AIT BGDE ATTN G3 SEC FT BLISS
8 CG USATCI & FT POLK ATTN AKPPO-DCOT
1 RSCH CONTRACTS & GRANTS BR ARO
1 BESD ARO OFC CHF OF R&D WASH DC
1 CHF OF R&D DA ATTN SCI INFO BR RSCH SPT DIV WASH DC
1 CO HQS BN USAFAC & FT SILL ATTN S3
4 CO III CORPS ARTY ATTN S3 FORT SILL
1 CO USRAH ATTN S3 FT SILL
1 CG USAFACFS ATTN AKPSIAG-AS FT SILL
1 EACH PROF OF MILITARY SCI USA ROTC
1 CINC US ATLANTIC FLT CODE 312A USN BASE NORFOLK
1 CINC PACIFIC SCIEN ADV GP (J30S) BOX 13 FPO 96610
1 CDR TNG COMMAND US PACIFIC FLT SAN DIEGO
1 CHF BUR OF MED + SURG DN ATTN CODE 513
1 CHF RES DIV BUR OF MED + SURG DN
1 HEAD CLIN PSYCHOL SECT PROFESNL DIV BUR OF MED + SURG DN
5 TECH LIB PERS 11B BUR OF NAV PERS ARL ANNEX
3 DIR PERS RES DIV BUR OF NAV PERS
1 TECH LIB BUR OF SHIPS CODE 210L NAVY DEPT
1 BUR OF YDS + DKS DN ATTN ASST CHF FOR RES DEVEL TEST + EVAL
2 NAV AIR SYS COMD REP ATLANTIC NAV AIR STA NORFOLK
1 ENGNR PSYCHOL BR ONR CODE 455 ATTN ASST HEAD WASH DC
3 CO + DIR NAV TNG DEVICE CTR ORLANDO ATTN TECH LIB

1 CO FLT ANTI-AIR WARFARE TNG SAN DIEGO
1 CO NUCLEAR WPNS TNG CTR PACIFIC US NAV AIR STA SAN DIEGO
1 CO NAV AIR DEVEL CTR JOHNSVILLE PENNA ATTN NADC LIB
2 US FLT AAW TNG CTR DAM NECK VA
2 CO FLT TNG CTR NAV BASE NEWPORT
1 CDR FLT TNG GP NAV BASE CHARLESTON
2 CO US FLT TNG CTR NORFOLK
1 CO FLEET TNG CTR US NAV STA SAN DIEGO
1 CLIN PSYCHOL MENTAL HYGIENE UNIT US NAV ACAD ANNAPOLIS
1 PRES NAV WAR COLL NEWPORT ATTN MAHAN LIB
3 CO SERV SCH COMD NAV TNG CTR SAN DIEGO
3 CO NAV GUIDED MSL SCH DAM NECK VA BEACH
2 CO & DIR US ATLANTIC FLT ASW TACTICAL NORFOLK
1 CO NUCLEAR WEAPONS TNG CTR ATLANTIC NAV AIR STA NORFOLK
2 CO FLT SONAR SCH KEY WEST
1 CO FLT ANTI-SUB WARFARE SCH SAN DIEGO
1 CHF OF NAVL RSCH PERS & TNG BR (CODE 458) ARL VA
1 CHF OF NAV RES ATTN DIR PSYCHOL SCI DIV CODE 450
1 CHF OF NAV RES ATTN HEAD GP PSYCHOL BR CODE 452
1 DIR US NAV RES LAB ATTN CODE 5120
1 DIR NAVAL RSCH LAB ATTN LIB CODE 2029 WASH DC
1 CHF OF NAV AIR TNG TNG RES DEPT NAV AIR STA PENSACOLA
1 CO NAV SCH OF AVN MED NAV AVN MED CTR PENSACOLA
1 LIB NAV MED RES LAB NAV SUB BASE GROTON
1 CO MED FLD RES LAB CAMP LEJEUNE
1 CDR NAV MSL CTR POINT MUGU CALIF ATTN TECH LIB CODE 3022
1 DIR AEROSPACE CREW EQUIP LAB NAV AIR ENGNR CTR PA
1 CO + DIR NAV ELEC LAB SAN DIEGO ATTN LIB
3 OIC NAV PERS RES ACTVY SAN DIEGO
1 NAV NEUROPSYCHIAT RES UNIT SAN DIEGO
2 NAVAL MSL CTR (CODE 5342) PT MUGU CALIF
1 DIR PERS RES LAB NAV PERS PROGRAM SUPPORT ACTIVITY WASH NAV YD
1 NAV TNG PERS CTR NAV STA NAV YD ANNEX CODE 83 ATTN LIB WASH
5 COMDT MARINE CORPS HQ MARINE CORPS ATTN CODE AO-1B
1 HQ MARINE CORPS ATTN AX
1 DIR MARINE CORPS EDUC CTR MARINE CORPS SCH QUANTICO
1 DIR MARINE CORPS INST ATTN EVAL UNIT
1 US MARINE CORPS HQS HIST REF LIB ATTN MRS JADOT
1 CHF OF NAV OPNS OP-01P1
1 CHF OF NAVL OPS OP-039 WASH DC
1 CHF OF NAV OPNS OP-07TL
2 COMDT HQS 8TH NAV DIST ATTN EDUC ADV NEW ORLEANS
1 CHF OF NAV AIR TECH TNG NAV AIR STA MEMPHIS
1 DIR OPS EVAL GRP OFF OF CHF OF NAV OPS OP03EG
2 COMDT PTP COAST GUARD HQ
1 CHF OFCR PERS RES + REVIEW BR COAST GUARD HQ
1 CO US COAST GUARD TNG CTR GOVERNORS ISLAND NY
1 CO US COAST GUARD TNG CTR CAPE MAY NJ
1 CO US COAST GUARD TNG CTR & SUP CTR ALAMEDA CALIF
1 CO US COAST GUARD INST OKLA CITY OKLA
1 CO US COAST GUARD RES TNG CTR YORKTOWN VA
1 SUPT US COAST GUARD ACAD NEW LONDON CONN
1 OPNS ANLS OFC HQ STRATEGIC AIR COMD OFFUTT AFB
1 CINC STRATEGIC AIR COMD OFFUT AFB ATTN SUP-3
1 AIR TNG COMD/XPT RANDOLPH AFB
1 HQ AIR TNG COMD ATTES RANDOLPH AFB
1 TECH DIR TECH TNG DIV(HRD) AFHRL LOWRY AFB COLO
1 DEPT OF THE AF HQS USAF ATTN AFCIN-3D1 PENTAGON
1 CHF SCI DIV DRCTE SCI + TECH DCS R+D HQ AIR FORCE AFRSTA
1 FAA DRCTE OF PLNS & OPS HQ USAF WASH DC
1 CHF OF PERS RES BR DRCTE OF CIVILIAN PERS DCS-PERS HQ AIR FORCE
1 CHF ANAL DIV (AFPDPL (R) DIR OF PERSONNEL PLANNING HQS USAF
2 DPTY TIG USAF (AFIAS-G1) NORTON AFB
1 RADC RASH GRIFFISS AFB NY
2 CDR ELEC SYS DIV LG HANSCOM FLD ATTN ESMDA/STOP 36 MASS
2 SMAMA (SMACU-PERS RSCH) MCCLELLAN AFB
1 ATC ATXRQ RANDOLPH AFB
1 AFHRL/TT ATTN CAPT W S SELLMAN LOWRY AFB
1 HQ SAMSO (SMSIR) AF UNIT POST OFC LA AFS CALIF
2 MILIT TNG CTR OPE LACKLAND AFB
2 AFHRL (HRT) WRIGHT-PATTERSON AFB
1 AMD AMRH BROOKS AFB TEXAS
1 HQS ATC DCS/TECH TNG (ATTMS) RANDOLPH AFB
1 CDR ELEC SYS DIV LG HANSCOM FLD ATTN ESTI MASS
1 JSAF SCH OF AEROSPACE MED ATTN AEROMED LIB BROOKS AFB
1 USAFA DIR OF THE LIB USAF ACAD COLO
1 DRCTE OF AEROSPACE SAFETY AFIAS-L DPTY IG NORTON AFB
1 6570TH PERS RES LAB PRA-4 AEROSPACE MED DIV LACKLAND AFB
1 TECH TNG CTR (LMTC/OP-1-L1) LOWRY AFB
2 CO HUMAN RESOURCES LAB BROOKS AFB
1 COMDT USAF SPEC OP SCH (TAC) EGLIN AFB
1 AFHRL (FT) WILLIAMS AFB ARIZ
1 PSYCHOBIOLOGY PROG NATL SCI FOUND
1 DIR NATL SECUR AGY FT GEO G MEADE ATTN TDL
1 DIR NATL SECUR AGY FT GEO G MEADE ATTN DIR OF TNG
3 CIA ATTN CRS/ADD STANDARD DIST
1 SYS EVAL DIV RES DIRECTORATE DOD-OCD PENTAGON
1 DEPT OF STATE BUR OF INTEL + RES EXTERNAL RES STAFF
1 SCI INFO EXCH WASHINGTON
2 CHF MGT & GEN TNG DIV TR 200 FAA WASH DC
1 BUR OF RES & ENGR US POST OFC DEPT ATTN CHF HUMAN FACTORS BR
1 EDUC MEDIA BR OE HEW ATTN T D CLEMENS
1 NAT'L BUR STANDS BEHAV SCI GP ATTN DR D E ERLICK
1 OFC OF INTERNATL TNG PLANNING & EVAL BR AID WASH DC
1 FAA MED LIB HQ 640 WASH DC
1 DEPT OF TRANS FAA ACQ SEC HQ 610A WASH DC
2 ERIC OE WASH DC
1 CONSOL FED LAW ENFORCEMENT TNG CTR WASH DC
2 SYS DEVEL CORP SANTA MONICA ATTN LIB
2 DUNLAP + ASSOC INC DARIEN ATTN LIB
2 RAC ATTN LIB MCLEAN VA
1 RAND CORP WASHINGTON ATTN LIB
1 DIR RAND CORP SANTA MONICA ATTN LIB
1 GP EFFECTIVENESS RSCH LAB U OF ILL DEPT OF PSYCHOL
2 ELECT PERS RSCH GP U OF SOUTHERN CALIF
1 COLUMBIA U ELEC RES LABS ATTN TECH EDITOR

1 MITRE CORP BEDFORD MASS ATTN LIB
2 SIMULATION ENGR CORP ATTN DIR OF ENGR FAIRFAX VA
2 LEARNING R&D CTR U OF PITTS ATTN DIR
1 WESTERN ELECTRIC CO INC NY
1 HUMAN SCI RES INC MCLEAN VA
2 TECH INFO CTR ENGNR DATA SERV N AMER AVN INC COLUMBUS O
1 CHRYSLER CORP MSL DIV DETROIT ATTN TECH INFO CTR
1 AVCO CORP AVCO MSL SYS DIV ATTN RSCH LIB WILMINGTON MASS
1 CTR FOR RSCH IN SOCIAL SYS ATTN LIBN MD
1 RAYTHEON SERV CO ATTN LIBN BURLINGTON MASS
1 GEN DYNAMICS POMONA DIV ATTN LIB DIV CALIF
2 OTIS ELEVATOR CO DIV ATTN LIB STAMFORD CONN
1 MGR BIOTECHNOLOGY AEROSPACE SYS DIV MS 8H-25 BOEING CO SEATTLE
1 IDA RSCH & ENG SUPT DIV ARL VA
1 SCI & TECH DIV IDA ARL VA
1 HUGHES AIRCRAFT COMPANY CULVER CITY CALIF
1 DIR CTR FOR RES ON LEARNING + TEACHING U OF MICH
1 R M STOGDILL OHIO STATE UNIV
1 EDITOR TNG RES ABSTR AMER SOC OF TNG DIRS U OF TENN
1 U OF CHICAGO DEPT OF SOC
1 HUMAN FACTORS SECT R+D GEN DYNAMICS ELECTRIC BOAT GROTON
1 DIR CTR FOR RSCH IN SOCIAL SYS KENSINGTON MD
3 CANADIAN JOINT STAFF OFC OF DEF RES MEMBER WASHINGTON
3 CANADIAN ARMY STAFF WASHINGTON ATTN GSO2 TNG
2 CANADIAN LIAISON OFCR ARMY ARMOR BD FT KNOX
1 GERMAN LIAISON OFCR ARMY AVN TEST BD FT RUCKER
2 OFC OF ARMED FORCES ATTACHE ROYAL SWEDISH EMBSY DC
3 AUSTRALIAN NAV ATTACHE EMBSY OF AUSTRALIA WASH DC
2 FRENCH ARMY LIAISON OFCR USAAVNC & FT RUCKER
1 BRITISH LIAISON OFCR ARMY AVN TEST BD FT RUCKER
1 OFC OF AIR ATTACHE AUSTRALIAN EMBSY ATTN: T.A. NAVGN WASH, D.C.
2 AUSTRALIAN ARMY ATTACHE EMBSY OF AUSTRALIA ATTN TECH CLK
2 DR B T DODD LRNING SYS LTD SURREY ENGLAND
1 MENNINGER FOUNDATION TOPEKA
1 AMER INSTS FOR RSCH SILVER SPRING
1 AMER INSTS FOR RSCH ATTN LIBN PA
1 DIR PRIMATE LAB UNIV OF WIS MADISON
1 DR E GINZBERG COLUMBIA UNIV SCH OF BUS
3 MATRIX RSCH CO FALLS CHURCH VA
1 EDUC & TNG CONSLT CO LA CALIF
1 OBERLIN COLL DEPT OF PSYCHOL
1 DR GEORGE T HAUTY CHMN DEPT OF PSYCHOL U OF DEL
1 GEN ELECTRIC CO SANTA BARBARA ATTN LIB
1 VITRO LABS SILVER SPRING MD ATTN LIBN
1 HEAD DEPT OF PSYCHOL UNIV OF SC COLUMBIA
1 TVA PERS STAFF OFCR KNOXVILLE TENN
1 U OF GEORGIA DEPT OF PSYCHOL
1 U OF UTAH DEPT OF PSYCHCL
1 GE CO WASH D C
1 AMER INST FOR RSCH ATTN LIB PALO ALTO CALIF
1 COLL OF ARTS & SCI U OF MIAMI ATTN L L MCQUITTY
1 ROWLAND + CO HADDONFIELD NJ ATTN PRES
1 NORTRONICS DIV OF NORTHROP CORP ANAHEIM CALIF
1 OHIO STATE U SCH OF AVN
1 SCI RSCH ASSOC INC DIR OF EVAL CHICAGO ILL
2 AIRCRAFT ARMAMENTS INC COCKEYSVILLE MD
1 DR J B CULLEN DEPT OF SOC & ANTHROP UNIV OF RI
2 OREGON STATE U DEPT OF MILIT SCI ATTN ADJ
1 AMER PSYCHOL ASSOC WASHINGTON ATTN PSYCHOL ABSTR
1 NO ILL U HEAD DEPT OF PSYCHOL

1 GEORGIA INST OF TECH DIR SCH OF PSYCHOL
1 BELL TEL LABS INC TECH INFO LIB NJ
1 ENGNR LIB FAIRCHILD HILLER REPUBLIC AVN DIV FARMINGDALE N Y
1 LIFE SCI INC HURST TEXAS ATTN W G MATHENY
1 AMER BEHAV SCI CALIF
1 PUB ADMIN CTR ATTN J D KITCHEN SAN DIEGO
2 DIR INSTR RESOURCES STATE COLL ST CLOUD MINN
1 COLL OF WM + MARY SCH OF EDUC
1 SO ILLINOIS U DEPT OF PSYCHOL
2 ASSOC DIR CDC TNG PROG ATLANTA GA
2 WASH MILITARY SYS TECH LIB DIV BETHESDA MD
1 NORTHWESTERN U DEPT OF INDSTR ENGNR
1 DR L TWYFORD NY STATE EDUC DEPT ABSTRACT EDITOR AVCR
1 AEROSPACE SAFETY DIV U OF SOUTHERN CALIF LA
1 MR BRANDON B SMITH RES ASSOC U OF MINN
1 DR V ZACHERT RT 1 GOOD HOPE GA
1 J P LYDON DIR JR ROTC SAN ANTONIO TEXAS
1 DR E FOULKE DEPT OF PSYCH UNIV OF LOUISVILLE
2 CHRYSLER CORP DEF ENGR ATTN DR H BERMAN DETROIT
1 DR S ROSCOE ASSOC DIR FOR RSCH INST OF AVN U OF ILL
1 DR C HELM DEPT EDUC PSYCH CITY U OF NY
1 DR E PERKINS PROF OF PSYCH ST CLOUD STATE COLL MINN
1 GEN H P HARRIS (USA RET)PRES THE CITADEL SC
1 DR H SHOEMAKER DIR TNG RSCH GP NY
1 U OF MINN DEPT OF INDUST EDUC ATTN R E KUHL
1 VOC-TECH EDUC PROG PLNNG DEV ATTN W STOCK ST PAUL
1 CHF PROCESSING DIV DUKE U LIB
1 U OF CALIF GEN LIB DOCU DEPT
1 FLORIDA STATE U LIB GIFTS + EXCH
1 PSYCHOL LIB HARVARD UNIV CAMBRIDGE
1 U OF ILL LIB SER DEPT
2 U OF KANSAS LIB PERIODICAL DEPT
1 U OF NEBRASKA LIBS ACQ DEPT
1 OHIO STATE U LIBS GIFT + EXCH DIV
1 PENNA STATE U PATTEE LIB DOCU DESK
1 PURDUE U LIBS PERIODICALS CHECKING FILES
1 STANFORD U LIBS DOCU LIB
1 LIBN U OF TEXAS
1 SYRACUSE U LIB SER DIV
1 SERIALS REC UNIV OF MINN MINNEAPOLIS
1 STATE U OF IOWA LIBS SER ACQ
1 NO CAROLINA STATE COLL DH HILL LIB
2 BOSTON U LIBS ACQ DIV
1 U OF MICH LIBS SER DIV
1 BROWN U LIB
1 COLUMBIA U LIBS DOCU ACQ
1 DIR JOINT U LIBS NASHVILLE
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1 U OF PGH DOCU LIBN
1 CATHOLIC U LIB EDUC & PSYCHOL LIB WASH DC
1 U OF KY MARGARET I KING LIB
1 SO ILL U ATTN LIBN SER DEPT
1 KANSAS STATE U FARRELL LIB
1 BRIGHAM YOUNG U LIB SER SECT
1 U OF LOUISVILLE LIB BELKNAP CAMPUS
1 GEORGETOWN U LIB SER DEPT WASH DC
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